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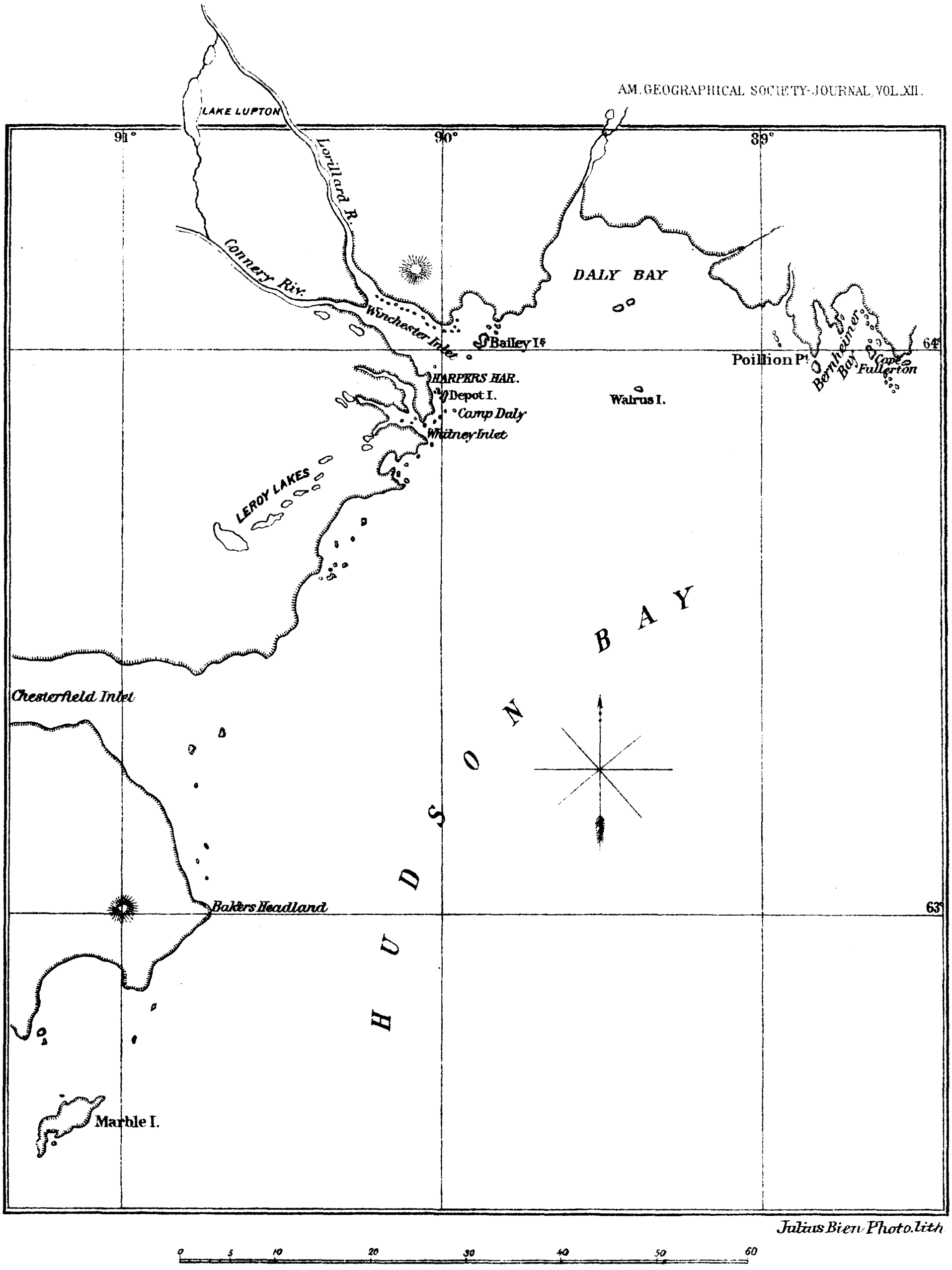

Julius Bien Photo. lith

Lieut. Schwatka's Chart of his Survey of the Coast of North Hudson's Bay

Franklin Search Expedition

ANNUAL ADDRESS

OF

CHIEF JUSTICE DALY, LL.D.,

PRESIDENT OF THE SOCIETY.

Geographical Work of the World in 1878 & 1879.

INTRODUCTION.

Before entering upon an account of the geographical work of the world during 1878 and 1879, I would call attention to the great increase during the last few years of geographical societies. Eight have been formed within the last two years alone, and there are now throughout the world fifty-one of these organizations; the last two being one in Algeria and one in Japan. Our own society is the fifth in the number of members, though, as respects its annual revenue and ability to aid in the work of geographical exploration, it is much below bodies in Europe inferior to it in point of numbers. The oldest is the French Geographical Society of Paris, established in 1821; the largest and the most influential are the Royal Geographical Society of London, which has 3,337 members, and an annual income of about $40,000, and the Imperial Geographical Society of St. Petersburgh, with an annual income of about $33,000, $12,000 of which is contributed by the Russian government.

The ample revenue of the most efficient of these bodies does not depend solely, as in our Society, upon the payment of a fixed sum annually by the members, but is augmented by governmental aid, or by a fund derived from bequests or gifts by intelligent persons who have appreciated what these bodies accomplish, in opening up to trade, commerce and civilization unknown, or imperfectly known, parts of the earth. Our Society has never received any pecuniary aid from government, state or national; and, so far, it has never occurred to any one to leave us, by bequest, or to give us, representing as we do so large and influential a country, any sum of money to enable us to aid as we ought to do in the great work of geographical exploration and discovery.

Large sums are given in this country to found or endow colleges, to create or aid charitable institutions, or to establish observatories to enlarge the range of astronomical knowledge. I am the last to find fault with this large-minded liberality, especially to question the utility of aiding astronomical enquiries, but I cannot help thinking that it is quite as important to be thoroughly acquainted with the world that we inhabit as it is to become better informed of the myriads of worlds that are revolving around us. There is a large portion of the earth that is yet unknown. There are great and fruitful regions that, if opened up to general intercourse, would greatly add to the wealth of the world, create new pathways for trade and commerce, and facilitate the disposition of the manufactures and other products of the industry of civilized races. Nothing has contributed to do this more efficiently than the organized efforts of geographical societies. It is not only by what they are able to do in sending explorers to unknown regions but, by the influence they exercise upon public opinion and upon governments that the work of exploration and discovery is kept up as it has been during the last quarter of a century.

As long as there remains large portions of the earth to be discovered or more fully explored, the same reasons apply that existed when, in the fifteenth century, the first steps were taken which produced that great movement in favor of maritime exploration and discovery that led to the circumnavigation of Africa and the discovery of America. It had its origin in what was substantially the same thing in its effect as the modern geographical society. It was brought about by Prince Henry of Portugal bringing together in the establishment which he founded upon the promontory of Sagres, on the southwestern extremity of Portugal, a number of men interested in geographical enquiries, to advise, consult, and project what should be done, to obtain a knowledge of what were then the unknown parts of the earth. It is to his and their labors in this early geographical society for twenty-three years, or up to the end of his life in 1460, that we owe the fact that America was discovered; and it is to the interest created by the action of geographical societies, since their institution in 1821, more than to anything else, that we owe the peopling of Australia and of New Zealand; the opening up of the great regions in Northern Asia, including China and Japan; the extensive explorations that have been made in Africa, so that the centre of that continent is no longer what it was a quarter of a century ago—a blank upon the map—as well as the exploration of our own great western territories, a work to promote and keep up which this Society devoted all its powers, at a time when the nation and the government were alike insensible to the importance of it; and the whole country is now realising the result in the large metallic wealth that has been discovered, and the valuable regions previously unknown, that have been opened up and partially settled. Surely this is as useful a work to promote by gifts or bequests as it is to endow colleges.

When Prince Henry, surnamed the Navigator, established his school—or, as I may properly call it, geographical society—upon the lonely promontory of Sagres, he adopted as his motto, "Talent de bien faire," which, as the words were then understood, meant the desire to be useful; and this motto expresses to-day the object and aim of geographical societies.

What they accomplish may not be directly traceable to them in every exploration or discovery, but it is the consequence of their pioneer efforts. The field of geographical labor is so diversified, it involves the accumulation of such enormous details and such continuous and infinite labors in the use of the details, that it is not possible to point out in advance what can be accomplished. It can be seen only in the results, and those results, as the history of geographical exploration and discovery for the last quarter of a century proves, have been far greater than the most sanguine expectation of those who first set on foot the enquiries.

With a very limited revenue, derived from the annual fee incident to membership, we have not been able to do our full share in this great work, though we have, in view of our resources, done a great deal. Through the liberality of a small number of our members, we have now a house of our own, in the most eligible part of the city, which, I am happy to say, is paid for, at least with the exception of a very small amount, which we are able at any time to discharge. The policy, adopted a few years ago, of encouraging by the payment of $100 life fellowships, for the establishment of a permanent fund, the income only of which is devoted to the use of the Society, has been most successful; that fund now amounting to over $9,000. Members duly appreciating the utility of this policy, as the best means of securing the permanency of the Society and extending its usefulness, have already, to a considerable number, become life members by the payment of $100 each, and I trust that all who feel an interest in the great work to which the Society is devoted will become life fellows, as I am convinced that this will prove one of the most efficient means for its permanency and increased utility in the future. One of our aims was to establish in this commercial and maritime metropolis of the North American continent an institution where reliable information could be obtained of every part of the habitable globe, and it is to this, in the past, that the surplus funds of the Society have been chiefly devoted by the accumulation of a geographical library, and as full a collection of maps and charts, of every part of the world, as it was in our power to obtain. We have now a geographical library which numbers more than 14,000 volumes. In the diversified character of it, embracing as it does works of travel and exploration in every part of the globe, the most desirable scientific treatises, many rare works, and an unusually large collection of atlases, beginning with the first atlas by Ortelius, in 1570, and extending in a continuous chain down to the present time, we have a geographical library equal to any that exists in any country. Our collection of maps and charts, however, though the largest in this country, is by no means what it ought to be, and is greatly inferior to that of the Royal Geographical Society of London. It is a department in which inquiries are constantly made, and that requires a considerable expenditure to keep it up. Geographical societies in Europe receive from governments, gratuitously, large numbers of maps and charts, and are not put to the expenditure that we are in procuring this most important means of information; but if our permanent fund should be considerably augmented, as I trust it will be, by life memberships, we will be able to devote an amount to this purpose which will greatly augment our collection, and make it what the incessant demands upon it show that it ought to be. It will be agreeable for you to know that persons come from all parts of the United States to consult our collection of maps, who very generally find, although not always, what they have long been searching for, and warmly express their appreciation of the utility of the Society.

I will close this branch of my subject by saying that after a long struggle to build the Society up, we may congratulate ourselves upon the fact that its permanency as a national institution is now assured, although a great deal is yet to be done to make it what it should be, and which will be done, as our means increase. We are now, however, firmly enough established to be able to say that we can carry out Prince Henry's motto of "Talent de bien faire," the ability to be useful.

GENERAL GEOGRAPHICAL WORK.

I shall begin my account of the labors of the last two years by referring to that branch of geographical work which relates to the earth generally.

COMPLETION OF THE MEASUREMENT OF AN ARC OF THE MERIDIAN.

Among the most interesting results in this general field of enquiry, is the completion of a work to which I have frequently called attention—the measurement of a new arc of the meridian. This work, which has been going on for several years, was instituted by the governments of France and Spain, for the measurement of an arc of the meridian by a system of triangles, extending from the northernmost of the Shetland Islands, in 61° N. lat., to the borders of the great desert of Africa, south of Algeria, to the 34° N. lat. and was successfully completed last September. The great difficulty was to extend the line of triangulation across the Mediterranean from the coast of Europe to the coast of Africa, which, after many failures, was finally accomplished by means of the electric light. The vapors of the Mediterranean proved so impervious to the rays of the electric light, that to produce sufficient intensity it was necessary to construct an electro-magnetic apparatus, propelled by steam-engines. After twenty days of repeated efforts and failures, the electric light, from Tetica, in Spain, became visible to the eye on the African coast like a round, reddish disk on the horizon; and on the following day the electric light from Mulhacen, in Spain, was seen, and the work was accomplished, so that we now possess a meridian arc of 27 degrees, the greatest ever measured on the earth's surface.

PROPOSED COMMON MERIDIAN.

Several attempts have been made during the past few years to get the different nations of the world to agree upon a common meridian, instead of having each adhering to its own, like the meridians of Greenwich, Paris, Washington, &c. The meridian of Greenwich has been most generally accepted, for the reason that it is a very good line of division; and as the English are a leading nautical nation, the meridian of Greenwich is the one found most extensively upon maps and charts. For these practical reasons we have, in this country, generally been disposed to adhere to it, and would probably be quite willing, as a nation, to unite in its adoption. But when the question of doing so arose in the Geographical Congress at Antwerp, the disposition of the French members was to adhere to the meridian of Paris, and as it seems to be difficult to get one nation to adopt the meridian of any other, the object might be effected by adopting a common meridian solely upon geographical grounds. In this view, M. de Beaumont, President of the Geographical Society of Geneva, recommends that the initial or first meridian should be one passing through Behring's Straits. This meridian, M. de Beaumont suggests, can be very easily connected with work based on the principal meridians of Greenwich, Paris, Ferrol and Washington. It would touch the extremity of the American continent at Cape Prince of Wales, and traverse, on the one hand, the whole length of the Pacific, without touching any land; and on the other, all Europe through its centre, from the top of Spitzbergen, passing Copenhagen, Leipzig, Venice and Rome; and from thence cutting the African continent from Tripoli to Cape Frio, about 18° S. lat. M. de Beaumont urges, as advantages, that it would cut Europe into east and west, thus giving a division which has been tacitly recognized for ages, and that it presents about the largest terrestrial arc from 79° N. lat. to 18° S. lat., or 97° altogether; thus giving to science the longest continuous line of lands as a basis for astronomical, geodetic and meteorological observations, and other scientific researches. Passing as it would through a great number of states, it would become really an international meridian, as each nation might establish a station or observatory on the line of it.

As this would be, for the reasons above suggested, a very desirable first meridian, and as there appears to be no other way of getting over the disposition of nations to adhere to their own and of avoiding the confusion of having so many, I fully concur in M. de Beaumont's suggestion, and hope, as a practical relief from an existing difficulty, that it may hereafter be generally adopted. There is in my opinion so much good sense in the suggestion, that I think, in the course of time, the merit of it will become so fully recognized, that the force of public opinion, in each nation, will ultimately lead to the adoption of a line in which all can agree, without interfering with any national preference.

UNSURVEYED COASTS OF THE WORLD.

Lieutenant G. Temple, R. N., has recently called attention to the large portion of the coasts of the world that are still unsurveyed. He has pointed out that this is the fact in respect to a large part of the coast of South Africa, and especially the dangerous shore on the eastern portion of the Cape of Good

Hope where so many vessels have been wrecked and thousands of lives lost; also to parts of the eastern and western coasts of South America and on the Pacific side of Central America; the coasts of many of the islands of the Pacific, and of the Australian colonies; coasts in the Chinese seas, and in the routes between Australia, China and Japan; on the west coast of the peninsula of Siam, the inner channels of the Red Sea, parts of the Mediterranean and of the northern coasts of America and Hudson Bay. Here is a large work yet to be done in the interests of commerce, and which should be done by the naval vessels of the commercial nations of the world.

LOST ISLAND.

Doctor W. Fraser has ascertained from an unpublished work, containing maps of the French cartographer Tassin, that an island, named in the map Brazil, existed when the map was made on the western coast of Ireland, off the entrance to Galway Bay, which must afterwards have sunk beneath the ocean, there being nothing now in the same spot but a comparatively small rock, with its head projecting above the waters, and two banks indicated, one of which is sunken and the other is the present projecting rock, the whole being known upon the present charts as Porcupine bank.

INGENIOUS REPRESENTATION OF THE EARTH AND SOLAR SYSTEM.

Signor N. Perini, of London, has constructed an ingenious piece of mechanism to show the arrangement and movement of the whole solar system. The upper part of an ordinary room is constructed as a blue dome, fourteen feet in diameter and fourteen high, sprinkled with stars, and around the base of the dome the constellations are arranged which form the zodiac. Suspended from the dome by a narrow tube is an opal globe, lighted with gas, representing the sun. From almost invisible wires the planets, with their various moons, and Saturn with his rings, are suspended around the sun at their appropriate distances, each having the proper inclination to the plane of its orbit, the earth being about the size of a walnut. By simply turning a key, the whole planetary system is set in motion. The sun turns upon its axis; the earth, by an ingenious watchwork arrangement inside, turns also upon its axis, as does the moon, around it; and all the planets move in their proper elliptical orbits in relatively proportional time.

The moving power is clockwork; not a sound, however, is heard, but the whole moves in solemn silence. The entire mechanism can be made sufficiently small to adapt it for instruction in schools. It can be easily taken to pieces, does not get out of order, and shows better than anything heretofore devised the immense difference between the length of the years of the earth and those of the outer planets.

PHYSICAL GEOGRAPHY.

In the department of scientific geography, especially in physical geography, valuable contributions have been made by those particularly devoted to these branches of inquiry.

RESULTS OF THE SCIENTIFIC VOYAGE OF THE CHALLENGER AROUND THE WORLD.

Sir Wyville Thompson has given some interesting information, as the results of investigations made by him, chiefly in connection with facts ascertained in the scientific voyage of the *Challenger* around the globe. He finds that many of the physical conditions of the globe depend upon the fact of a division of it into two hemispheres: one embracing nearly the whole of the dry land, and the other a hemisphere almost entirely covered with water. He fixes the centre of what he calls the land hemisphere somewhere about the middle of Great Britain, and of the water hemisphere in the neighborhood of New Zealand. He calls the vast expanse of water which has its centre in the southern part of the globe the great ocean of the world—of which the Atlantic, with the Arctic Sea and the North Pacific, are merly gulfs, extending northward. In his opinion, the principal cause of the movements of great masses of water is the trade winds, and that their modifications and counter-currents are the cause of all the movements. He says that the latest investigations show that all the vast mass of water, which is often two thousand fathoms in thickness, which lies below what he calls the neutral band, moves slowly northward; and that evaporation is greatly in excess of precipitation over the northern portion of the land hemisphere than it is over the great water's hemisphere, especially in the southern portion of that hemisphere. He says it is now thoroughly established, by soundings taken in all directions, that the average depth of the ocean is about two thousand fathoms, and that in all probability it nowhere exceeds five thousand fathoms; that depths beyond four thousand fathoms are very rare, and generally exist in the form of deep pits in the neighborhood of volcanic islands. He states that in all the ocean basins there are depressions extending over considerable areas where the depth reaches at least three thousand fathoms; that from three to four hundred miles from the shore, whether in deep or shallow water, formations are being laid down from the disintegration of shoals or rocks on the coasts; that, in depths of about two thousand fathoms, there is the *globigerina ooze*, formed of the shells of living organizations that existed on the surface of the sea, and sunk with the death of the amimal to the bottom; that this ooze occupies a large part of the bed of the Atlantic, considerable portions of the bed of the Pacific and of the southern seas, and that it resembles chalk; but that below three thousand fathoms no such accumulations have taken place—not a shell reaching the bottom—the carbonate of lime being entirely dissolved by the carbonic acid in the long descent of the shell; that in these deep abysses, which occupy an area of not less than ten millions of square miles, the sounding instruments bring up an extremely reddish clay, apparently the decomposition of submarine volcanoes and of decomposed organisms, and that this deep deposit is taking place with extreme slowness; that what is at present forming at the great depths of the ocean does not correspond either in structure or chemical composition with any known geological formation, and warrants the belief that none of the older formations of the globe were laid down at such great depths; and finally, he adopts the opinion of Professor Dana, of Yale College, that the eruptions which originated the mountain chains that form the skeleton of our present continents, and the depressions occupied by our present seas, arose from the cooling and contraction of the crust of the earth at a period more remote than the deposition of the earliest fossiliferous rocks.

Dr. Kroll, of Gottingen, has also been engaged in investigating the depth of the ocean and estimates the mean depth at 1,877 fathoms, an estimate not very much below that of Sir Wyville Thompson.

An event that occurred in the Falkland Islands last year will indicate how rapidly changes will take place on the earth's surface. In East Falkland, at the back of the town of Stanley, there is a range of heights surmounted by a large plateau, which enclosed an immense bog of peat, the growth or development of many centuries. This island is destitute of trees, and through some influence of the climate which is peculiarly favorable to the production of peat, every kind of plant, over the whole surface of the land, is gradually converted into this substance, which becomes so solid when dry that it will hardly burn. In the autumn of 1878 a southeasterly storm was attended by an immense rainfall, the effect of which was to loosen this immense deposit of peat and to saturate it so thoroughly that the whole of it ultimately came down the mountain sides with the velocity of half a mile an hour and moved into the sea.

METEOROLOGY.

There is no branch of geographical science which, during the past few years, has made greater progress, or that is more important, than meteorology. There are no laws a knowledge of which is more useful to man than those which bring about atmospheric changes, particularly to the agriculturist and the mariner. The effect, moreover, of atmospheric conditions upon health and disease render all inquiries upon this subject of the highest importance, not only in the treatment of, but in guarding against diseases.

The study of the weather hitherto by farmers, mariners, and others affected especially by it, has been a mere matter of indivdiual observation, and it was long doubtful whether it could ever be otherwise. It has now, however, become a matter of science, chiefly through the instrumentality of the telegraph; and the certainty with which great changes may be predicted, and the movements of storms indicated in advance, would a quarter of a century ago have been deemed incredible. In no branch of science have difficulties been more completely overcome which appeared to be insurmountable, or results obtained of more practical importance, and yet we are but in the very infancy of this inquiry. The fact that the New York *Herald* has so frequently been able to transmit to Europe by the telegraph intelligence in advance of the approach of storms moving towards the western coast of Europe, and to indicate their direction, is one of the most remarkable things in the history of science. In view of its practical utility, it is to be ranked amongst the greatest of modern achievements, and I do not think that we yet fully realize what has been done, or are prepared to anticipate what will be achieved in the future. I have already sufficiently detailed, in previous addresses, the nature of the work of our own Signal Service Bureau at Washington, which has become pre-eminent for its ability and its accuracy, as well as the co-operative work of like organizations now extending largely over Europe. It is only necessary, therefore, to say that during the past two years this efficient work has been continued, inspiring additional confidence in its value, and that a remarkable feature in the work of our own bureau at Washington has been a series of charts based upon the state of the barometer, the thermometer, and of the weather generally, in different parts of the globe. This route is so arranged that the observations at different places—for instance, at Washington, London, St. Petersburg, Constantinople—are not taken in the four cities at the same local clock time, but at precisely the same moment, the observer and readers in the several cities being all actually at their instruments at once.

SEVERITY OF RECENT WINTERS IN EUROPE.

The past two years have been distinguished by exceptional and very marked changes of the ordinary temperature in different parts of the world, particularly in Western Europe, in certain parts of Asia, and in the eastern portion of the United States. It has been marked in Europe by winters of increased severity and an undue prevalence of moisture in the spring and summer, attended by very disastrous consequences to agriculture in Great Britain, France, and some other countries. The last winter on the

European continent, as well as in Great Britain, has been one of the severest upon record. In France the thermometer has never been as low since 1795, with the exception of one year, 1871, when the cold, however, was but of short duration.

In Switzerland and South Germany, especially in the mountainous parts, the severity of the winter has been exceedingly disastrous, frequent instances occurring of men, women, children and domestic animals being frozen to death. In this part of Europe the last has been the severest winter known for half a century; while in this country the winters, especially the present winter, has been one of unusual mildness in all the States east of the Mississippi.

EXCESSIVE DROUGHTS AND GREAT SNOWFALL IN ASIA.

In Asia the changes in the ordinary temperature have been equally remarkable. In some parts disastrous effects have been produced from excessive moisture, but most generally from the opposite, or long periods of draught which diminished in a large degree the production of the fruits of the earth, and which was attended in Persia, India and in certain parts of China by terrible famines.

In the mountains of Cashmere there was a snowfall last winter extraordinary even in that mountainous region. In certain places it snowed uninterruptedly and heavily for ten continuous days, the snow upon the level plains being from thirty to forty feet deep, and in some of the mountain passes it was piled up to a height of one hundred and fifty feet, and in others to two hundred and fifty feet. The earth was torn from the hillsides and precipitated into the valleys in the spring by the weight of the descending avalanches. The destruction of wild animals was very great. Even the bears were kept so long shut up in their winter homes by the masses of snow that most of them perished from hunger—a very unusual circumstance, as the bear is the denizen of regions of ice and snow, and makes his way and lives where other animals cannot.

Various conjectures have been advanced as to the cause of this unusual change of temperature. A writer in the New York *Herald* attributes the fact that the spring and summer in Europe was excessively rainy to an unusually vigorous movement of the Gulf Stream, in consequence of an exceptional pressure of the southeast trade winds, which he claims produced an extensive diffusion of Gulf vapor in a northerly direction, greatly mitigating the winds in the United States. Others attribute these effects to a change in the condition of the sun, which during the last year is said to have been in a state of repose that is very rare, there being no spots or eruptions visible upon its surface. The latter theorists maintain that when the sun spots are at the greatest height, or at their maximum, the earth receives the greatest quantity of heat, and that when the spots are at the lowest, or their minimum, the heat is proportionately lessened, and they claim that these changes, which are known to occur regularly within certain periods, correspond with the great changes of temperature on the earth; the sun's activity with the warm and dry years, and the periods of repose with the cold and rainy years. Others, however, dispute this altogether, declaring that the observations that have been made of the maximum periods of the spots on the sun's surface do not coincide over any length of time, with the warm and cold years, and do not, therefore, justify any such inference.

Monsieur de Perville, on the other hand, maintains, as the result of long observations of dry and rainy seasons in Europe, that they correspond with known changes of the moon. In connection with which I may mention, as a curious fact, derived from recent Assyrian researches, that the Babylonians and Chaldeans attributed changes in the weather to the influence of the moon, and kept up a system of regular observations of the moon for practical purposes.

WANT OF MOISTURE AND FAMINES FROM DESTRUCTION OF FORESTS.

The extreme dryness and consequent want of moisture for the fertilization of the fields in parts of India and China, hitherto fruitful and thickly populated, is attributed to the wanton destruction of the forests on the hillsides. In 1879 Mr. Hilliard visited the famine-stricken province of Shang-Si, in China, and after giving heart-rending details of the terrible effects of the famine—details too painful to state—found in these famine districts that the trees had been extensively destroyed, and attributes the want of moisture and the consequent infertility of the soil to this cause. In the northwest provinces of India an enormous quantity of wood was cut from the hillsides and mountains for the construction of railroads, in consequence of which the soil has been torn from the mountain sides by torrents and precipitated in the valleys below, bringing ruin and destruction upon what was formerly well cultivated fields. The same results have been observed in the Caucasus, where the extensive cutting down of the timber around Tiflis has had the effect of drying up the earth and diminishing the volume of water necessary for the fertilization of the valleys; where also famine is apprehended. A large portion of Persia has suffered in the same way from like causes over a long period of years, a part of Persia which must have been exceedingly fruitful from the accounts given of it by ancient writers.

Observations made in France by Mr. Mathieu and by Mr. Fautral over a period of four years, by different methods, as to the effect under trees and the effect in treeless plains led to the same general results, which are as follows: That it rains more abundantly over forests than over open ground, especially when the trees are in leaf; that the air above the forest is more saturated with moisture than over the open ground; that the leaves of trees intercept one-third and, in some trees, half of the rainfall, and that the leaves and branches restrain the evaporation of the water which reaches the ground, moistening the earth four times as much as it is moistened by the rain that falls upon open plains. I have been thus particular in enumerating the terrible effects that have recently taken place in China and in India, because I have frequently heretofore in my addresses referred to the excessive and wanton destruction of forests and of the trees upon hill-sides in this country, and to the inevitable consequences which will ultimately follow from it—a destruction which is still wantonly going on, showing an ignorance on the part of our people and governments as gross as that which has produced such calamitous effects in China, India and Persia. A large portion of Northern Africa, now a sandy desert, was once a fertile country, and well populated, as we know from ruins and tombs that are still standing in what is now a vast desert of sand—an effect brought about by the wholesale destruction of trees and the neglect to replace them by replanting. Numerous instances might also be referred to of like effects in certain parts of Europe, where now, however, rigorous laws are enforced for the preservation of forests by compelling the replanting of trees to repair the consequences of cutting them down for timber, and also to other parts of the world, where upon what was once extensive fertile tracts nothing now remains but sandy desolation. Prosperous, fertile and wonderfully productive as our own country now is, if this wholesale destruction of trees is permitted to go on, without any measures to compel replanting, the like results will follow here, and in some parts will be more rapid than in others. Our national government is now directing enquiry to this subject, but our state governments, so far as I know, have done nothing; and yet it is by them chiefly that proper laws should be enacted and enforced to prevent what may ultimately prove a great national calamity.

ETHNOLOGICAL.

DISCOVERY OF A LOST CITY.

Geographical enquiries are not limited to the discovery of unknown countries or places, but embrace the discovery of the remains of lost civilizations or cities, one of which has been discovered during the last two years. The readers of the Bible will remember the frequent mention that is made of the Hittites, a people occupying Canaan, who are described in the biblical narrative as being commercial and military, and in whose country Abraham bought a piece of land for his burial place. The scattered accounts in the Bible simply indicate an ordinary tribe of people, with whom the Israelites had intercourse, but information derived from the researches made in Egypt and Assyria show that the Hittites, whom the Egyptians called the Kheta, and the Assyrians the Khatti, were a powerful confederacy occupying the country which was the highway between Babylonia or Assyria and Egypt; a people actively engaged in commerce, their principal city being a place to which merchants from all parts congregated, and who were at the same time a warlike people, who for a long period kept the Assyrians in check, and who proved the most formidable antagonists the Egyptians ever encountered. They were not only commercial and warlike, but had evidently at a remote period made great advances in civilization and in the fine arts, and early Greek art, as found in the discoveries of Dr. Schlieman at Mycenæ, and the early art found in Cyprus by our associate Gen. Di Cesnola, is supposed to have been largely derived from them.

They occupied the whole country of Southern Syria, from the Mediterranean to the desert, dwelling chiefly in the fertile valleys of the Orentes, a river rising to the east of Balbec and flowing into the Mediterranean, and had two principal cities—Kadesh, or the holy city, and a great commercial emporium, which was their capital and the centre of their power, called Carchemish. They were finally overthrown by the Assyrians B. C. 718, and had so completely disappeared that they are scarcely even referred to by Greek writers. Great interest was felt to discover the site of their commercial capital, Carchemish, and many conjectures have been made, none of which, however, could be verified. A few years ago Mr. Skene, the British consul at Aleppo, discovered a huge mound of earth, covering a large area, on the western shore of the lower Euphrates, near Déjrabis, a ford of that river on the route still traversed by caravans. This great mound was surrounded by ruined walls and broken towers, whilst the mound itself was but a mass of earth, fragments of masonry and debris. It had frequently been seen by previous travelers, but they identified it with other lost places. Mr. Skene called the attention to it of the late George Smith, the eminent archæologist, who brought so much to light from the ruins of Nineveh, and Mr. Smith found here the long-lost capital of the Hittites. The present British consul, Mr. Henderson, has been during the last two years engaged in the exploration of the mound. He has already sent important remains with inscriptions to the British Museum, and an English traveler, Mr. Sackaw, has been recently engaged in investigating it. A few years ago a stone, which had formed part of the wall of a house at Hameth, had an inscription upon it which excited great curiosity, because it was neither Assyrian nor Egyptian, but something between both languages. It may be remembered that I called attention in one of my former addresses to the discovery of this stone and one or two others, containing like characters, which were then called the Hamite inscriptions, with the suggestion that this might probably be the language of the Hittites, which is now proved to be the fact. The inscriptions found by Mr. Henderson in the exploration of Carchemish are not only in the same character, but the same language, which Mr. Layard found impressed upon seals discovered by him in the ruins of the record chamber of Senacherib's palace, which greatly excited his curiosity, as the writing was unlike any ever noticed before. Another inscription was afterwards discovered at Aleppo by Mr. Davis, a missionary; and it also turns out that the famous figures sculptured above the roads from Ephesus to Phocea, and from Smyrna to Sardis, which are mentioned by Herodotus, and were supposed by him to represent the Egyptian King Rameses the Second, the Sesostris of the Greeks, have inscriptions upon them in the same character as that recently found in Carchemish, showing that these figures also are Hittite monuments. It is supposed that this language was the source of what is known as the Cypriote syllabery, found in Cyprus, a system of characters each of which do not, like the letters of the alphabet, represent a single sound, but a syllable, which was probably the language in use among commercial people throughout Asia Minor, until it was superseded by the simpler and more practical Phœnician alphabet, and that a connection existed between these two languages is probable as the Hittites belonged to the same race of people who perfected by the alphabet, that greatest of human inventions, a written language. We have in this discovery of Mr. Smith the memorials of a lost people, in neighboring proximity to the Phœnicians; a people who had an important part in the early progress of ancient civilization, with respect to which an eminent Egyptian scholar expresses his conviction that future discoveries in the course of this exploration will afford convincing proofs that this civilization, which was of the highest antiquity, was of an importance which we can now only guess at.

RESULTS OF THE DISCOVERIES AT NINEVEH.

What may be anticipated when scholars are able to read these inscriptions, as in all probability they will be, for the cuneiform or arrow-headed characters of Assyria have been read, is foreshadowed by what has been brought to light by the discoveries of Layard and Smith in the mound which now represents what was once Nineveh. Beneath a mass of rubbish was found the remains of what had been a great Assyrian library, the materials of which being of baked clay had proved indestructible, and though lying in broken fragments, Mr. G. Smith was able to piece the fragments together, and recover over three thousand inscriptions, forming pages of the volumes of which the library was composed, and in some cases recovering entire books. The tablets or leaves of these volumes or bricks, as they are called, are formed of thin plates of clay, upon either side of which the text was inscribed when the clay was soft, the tablet being afterwards baked or dried, when the bricks or leaves, like our modern books, were arranged in chapters and volumes. Nearly two-thirds of this library is now in the British Museum, which, through the politeness of Mr. R. H. Major, I had the pleasure of inspecting in 1874. It embraces treatises on history, astronomy, geography, religion, morality, astrology, and other subjects. From one of these books, compiled after the manner of our modern encyclopædias, and the compilation of which is shown to have been made more than 2,000 B. C., it has been ascertained, what has long been supposed, that Chaldea was the parent land of astronomy; for it is found, from this compilation and from other bricks, that the Babylonians catalogued the stars, and distinguished and named the constellations; that they arranged the twelve constellations that form our present zodiac to show the course of the sun's path in the heavens; divided time into weeks, months and years; that they divided the week, as we now have it, into seven days, six being days of labor and the seventh a day of rest, to which they gave a name from which we have derived our word " sabbath," and which day, as a day of rest from all labor of every kind, they observed as rigorously as the Jew or the Puritan. The motion of the heavenly bodies and the phenomena of the weather were noted down, and a connection, as I have before stated, detected, as M. de Perville claims to have discovered, between the weather and the changes of the moon. They invented the sun-dial to mark the movements of the heavenly bodies, the water-clock to measure time, and they speak in this work of the spots on the sun, a fact they could only have known by the aid of telescopes, which it is supposed they possessed, from observations that they have noted down of the rising of Venus and the fact that Layard found a crystal lens in the ruins of Nineveh. These "bricks" contain an account of the deluge, substantially the same as the narrative in the Bible, except that the names are different. They disclose that houses and land were then sold, leased and mortgaged, that money was loaned at interest, and that the market gardeners, to use an American phrase, " worked on shares"; that the farmer, when plowing with his oxen, beguiled his labor with short and homely songs, two of which have been found; and to connect this very remote civilization with the usages of to-day, I may, in conclusion, refer to one of the bricks of this library, in the form of a notice, which is to the effect that visitors are requested to give to the librarian the number of the book they wish to consult, and that it will be brought to them; at the perusal of which one is disposed to fall back upon the exclamation of Solomon, that there is nothing new under the sun.

A writer in the *London Times* has said, in respect to these discoveries, that they have opened up to us an extinct civilization, that existed before Rome or Athens was founded, of which nearly every trace and memorial had been lost until these discoveries were made a few years ago; that a new and earlier page in the history of mankind—in that of religion, science, and the arts—has been opened by the discovery of the remains of this library, which Abraham may have consulted in what was the land of his nativity.

CHINESE INSCRIPTIONS FOUND AT HISSARLIK.

A very curious fact has come to light, resulting from Dr. Schlieman's discoveries in the Troad. In the lowest strata of his excavations at Hissarlik he found a vase with an inscription in an unknown language. Six years ago, the eminent orientalist, E. Burnouf, declared the inscription to be in Chinese characters, for which he was generally laughed at at the time, from the improbability of Dr. Schlieman finding, in the lowest strata of his excavations, a vase with an inscription in the Chinese language. Now, however, it appears that the Chinese Ambassador at Berlin, Li Fangpau, who in his own country is a distinguished scholar, has read and translated the inscription, which, he says states that three pieces of linen gauze are packed in the vase for inspection, being what we, in our day, would call sending a sample of merchandise into a foreign country to create a demand for it. E. Burnouf previously declared that the inscription was to the effect that the vase contained pieces of goods (*pieces d'étoffe*). The Chinese Ambassador fixes the date of the inscription as about 1200 B. C., and further states that the unknown characters so frequently occurring on the antiquities found by Dr. Schlieman, especially on the terra cotta, are also in the Chinese language, which would show that, at this remote period, commercial intercourse existed between China and the eastern shores of Asia Minor and Greece.

DISCOVERIES OF PREHISTORIC REMAINS IN EUROPE.

Discoveries are constantly being made in different parts of Europe of prehistoric remains, chiefly consisting of implements, utensils, &c.; and some further discoveries have been made of lacustrian dwellings lying below the waters of lakes. Explorations were made along the shores of Lake Garda, in Italy, and a large number of prehistoric relics were found. Discoveries of this character, or, as they are usually called, "lacustrian finds," have during the last year been unusually rich in Switzerland; many of the lakes being cut off from much of their accustomed supply of water, and reduced to an extremely low level. Many new things have been brought to light, especially in the lakes of Neufchatel and Morat. The discoveries have been of a very interesting kind, and have led archæologists to revise some of their former opinions, and assign to the lake dwellers of Switzerland a higher degree of civilization than they had been previously supposed to possess. The most remarkable find, both as respects the variety and the number of things discovered, was in a turf moor of peat moss near Seeberg, in the Canton of Berne. The indications are, that the ancient inhabitants who lived in the vicinity of this moor made their own tools and arms from materials brought from other places, and probably as far as what is now France, no flint being found in the neighborhood. Stones were found, splintered by the action of heat, which was supposed to have been used for the purpose of boiling water, as the lake dwellers had no vessels capable of standing fire. The pottery found was very primitive. It was made entirely by hand, and baked before an open fire. Some of the vessels were found with the remains of the food still adhering to them, and the design of the vessels, though rude, showed that those who made them were not without the artistic instinct. The discoveries proved that these people were basket-makers, and not unskilled in carpentry; one of the articles having a bent basket handle exactly like those at present in use, and the hatchet handles were found to be exceedingly well made. One wooden instrument bore a striking likeness to the stock of a pistol, and probably served as the haft of some bone tool or weapon for boring or thrusting. Bone chisels were very numerous, and arrowheads of the same material were found. The metatarsal bone of a stag was found, which had been fashioned to serve as a fork, and was evidently intended to be used for the purpose of eating. Forks have heretofore been supposed to be of comparatively modern invention, but this discovery indicates that the one of elegancies of life was appreciated at that remote period by the primitive inhabitants of this place. The remains of animals were very interesting—among them being the bones of the dog, the badger, the wild ox and the bear. The interesting fact was also ascertained that they were keepers of cattle, for the most numerous animal remains discovered were those of the common cow. There was evidence also that the pig had been domesticated; but no remains of the horse were discovered, showing that that animal was unknown to the inhabitants.

Mr. W. I. Knowles has found flint instruments in the valley of the river Bann, in the north of Ireland, underlying a formation of peat, the age of which is computed to be about seven thousand years. Mr. S. B. J. Sketchly has found palaeolithic implements in deposits of chalk and boulder clay, indicating, from the position in which the implements were found, that man existed in East Anglia previous to the glacial period; and M. Europeas, who has been for some time engaged in researches among the Finnish population of Northwestern Russia, has come to the conclusion that, in the first centuries of the Christian era, the whole of Northeastern Europe, as well as the Scandinavian peninsula, was peopled by tribes of Finnish-Hungarian and Finnish-Aryan origin, and that they then formed an extensive and powerful people.

ANCIENT EGYPTIAN RIVERS.

Dr. de la Motte, who is thoroughly acquainted with the geography and geology of Egypt, declares that the Nile was not the only river that watered prehistoric Egypt, but that the country was then watered by many rivers that are now dried up, and which the Arabs of to-day call, in the great beds of sand, *the rivers without water*, as shells and aquatic remains are found in them, indicating that they were once rivers. He does not, however, assume to indicate when, or what were the causes which led to this drying up, and changing into a desert what was once fertile regions. He is also of opinion that the whole plateau of Khartoum was formerly a great lake, like Lake Ukerewe (Victoria Nyanza), from which the Nile then issued.

AMERICAN PREHISTORIC REMAINS.

M. L. de Hessac has made an immense collection of Indian implements during two years of exploration on the coast of California, and Mr. I. M. McNiel has been engaged for several years in the exploration of graves in various parts of the Isthmus of Panama, the graves forming part of a vast cemetery of many miles in extent, in the vicinity of Mount Chiriqui, containing the remains of vanished races of whom nothing is known. The remains are chiefly pottery, generally of unglazed clay, made by hand by a people unacquainted with the potter's wheel, and small articles such as whistles and rattles, which appear to have been children's toys; the whole resembling articles that have been found in Etruria.

ANTIQUITY OF MAN.

There have been other discoveries throwing light upon the question of the antiquity of man, which, as they are of a like character, it is scarcely necessary to detail. It may be interesting, however, to give the latest conclusions upon this subject of Dr. E. B. Tyler, President of the Anthropological Institute of England, and one of the most eminent in this field of enquiry. He states, as the result of the evidence so far obtained, that the causes which brought about the differences in the form of the skull, the color of the hair and skin, and the physical constitution of men, had chiefly accomplished their work long anterior to the dawn of history; since when, he says, some changes may be traced, brought about by migrations or the effects of climate. He declares that the ground taken by Principal Dawson, of Montreal, the eminent geologist, fixing the period of development at about twenty-two hundred years B. C., is bringing it within the historic period, and that it has nothing, as shown by the Egyptian and Assyrian researches, to support it. Mr. Tyler states that the evidence now accumulated strengthens the probability that all men are descended from one original stock, which, he thinks, is inferable from the close resemblance of all human beings in body and mind, and from the freedom with which races intercross and produce mixed races. He thinks that the period anterior to history was one of vast length. He says, when we trace back early languages, such as the Aryan and the Shemitic, we do not find the parent tongue of any one of them, and that the attempt to reconstruct from them an earlier language brings us no nearer to the primitive form of speech, and that the whole structure of language is such that it can be accounted for only by the presumption of a long past. That history shows that the growth of every civilization was gradual, every age exhibiting recognizable traces of the ages that preceded it. That the

Egyptian monuments show that five thousand years ago civilization there was greatly advanced, as there was then in Egypt an elaborate system of government, a highly educated and literary priesthood, a nation skilled in agriculture, architecture, and in the arts, and especially in the working of metals, including iron; and that the Egyptians of this early period, so far from being near the beginning of civilization, had already advanced half-way. That it is shown by their monuments that the present native race of Egypt, the Fellahs, are little changed in feature and color from their ancestors as they appear on the early monuments, and that they are in fact the same people. He states that anthropologists now consider the Egyptians as belonging to an African rather than to an Asiatic race, as has been previously supposed; that they are in many respects different from the Shemitic races of Asia, but that a deep Shemitic element exists in the Egyptian language, showing that there was a very ancient and a very intimate connection. The reasonable conclusion, he thinks, is that they were a mixed race, but mainly of African origin, and that they came originally from the Southern Somali Land, which, according to Egyptian tradition, was the place from whence their Gods were derived. His further conclusion is that the Chaldeans and Babylonians, as indicated by their early languages, the Accadian and Medic, were of a Tartar or Touranian family, and may possibly have belonged to the yellow races of China, whilst the Assyrians were of the white race, and he thinks that the conclusion of many naturalists is correct that the geographical centre from which man emanated and spread over the globe was in the tropical regions of the old world.

Dr. R. Fahn, on the contrary, who has been making extensive linguistic researches in South America, comes to a totally different conclusion from Mr. Tyler. The doctor, in a communication recently published in Vienna, claims as the result of his researches that America is the old world, and Europe, Africa and Asia the new. He declares that the languages spoken by the Indians in Peru and Bolivia exhibit astounding affinities with the Shemitic languages, and especially with Arabic, with which the doctor is thoroughly acquainted from boyhood. He claims that the Shemitic roots are universally Aryan, and that the stems of all the varieties of the early Aryan tongues are found in their purest condition in the languages of the Indians of Peru and Bolivia, especially in the Quichua and the Aimara; and he maintains that the high plains of Bolivia and Peru are the central point from which the human race dispersed; which accords with the view expressed by some American archæologists that America is not only geologically but ethnologically the old world.

Prof. Mudge has gone into a calculation of the number of years to which the existence of man upon the globe may be traced. As the bones of man have been found at the close of the glacial epoch, Prof. Mudge founds his computation upon the probable duration of three epochs that followed each other, which are known to American geologists as the Champlain, the Terrace and the Delta periods; all of which, he says, are supposed to have been of equal length. He undertakes to compute the possible length of the last or Delta period, which he computes from the rate at which the delta of the Mississippi is deposited over a distance of about three hundred miles, and of the probable periods of the growths of ten buried forests, which, in that region, lie over each other with interspaces of sand, indicating that they must have succeeded one another; some of the trees of which are twenty-five feet in diameter, and one of which contains five thousand seven hundred annual rings. Without going into the details of his computation, I will simply give the result at which he arrives, which is that those three periods—the Champlain, the Terrace and the Delta—embrace a length of at least two hundred thousand years, during which, according to this computation, man has existed upon the earth. In respect to this conclusion, I have only to observe that all computations of this kind, as Lyell has shown in respect to the deposits of the Nile, are very uncertain data upon which to found any exact computation as to time; though they may indicate, all the conditions being well ascertained, that considerable spaces of time must have elapsed between successive periods. Professor Mudge says that the evidence which he produces would be received as proof of the facts in any court of justice; in respect to which I would say to the learned professor, having had much to do in my life in testing the uncertainty of evidence, that this belongs to a class where a great deal must be assumed in the present state of our knowledge, and that it is a kind of evidence upon which no conclusion can be based, except of a very loose and general kind. The best proof of this is the wide diversity of opinion that exists among geologists as to the length of time that elapsed in the formation of particular deposits or strata.

ARCTIC.

The Arctic events of the period under review have been as follows: In the summer of 1878 Captain Moria, of the Danish war steamer *Ingulf*, sighted the farthest land reached on the east coast of Greeland by Scoresby in 1821, but was unable from the obstruction of the ice to get any further north. Captain Burryene in the same year, in the *Barentz*, of the Dutch Arctic expedition, sighted Franz Josef Land, reaching 78° 18′ N. lat., being the first sailing vessel that has reached so far north. Captain E. Johannessen penetrated a considerable distance east of Nova Zembla in 77° 35′ N. lat. and 66° E. long., discovering an island ten miles long north of the Yenessei, in 77° 55′ N. lat., level and free from snow, with a poor vegetation, but containing an immense quantity of birds. From the types of animal life in the water, there was evidence that the Gulf Stream touched the west coast of this island, which lies a little to the southeast of Franz Josef Land, and may be a part of that archipelago. Captain A. H. Markham, R.N., and Sir Henry Gore Booth, in the Norwegian cutter *Isjorn*, succeeded in rounding Cape Nassau, reaching as far as Cape Mauritius, the extreme northeast point of Nova Zembla, and from there reached as far as 78° 24′ N. lat., being within eighty miles of Franz Joseph Land. In these several expeditions useful geographical work was done in the observation of currents, movements of the ice, dredging, examining the temperature of the water, and valuable collections were made in natural history.

MR. JAMES GORDON BENNETT'S EXPEDITION.

An important event has been the dispatch of the steamer *Jeanette* by the way of Behring's Straits, with a view of exploring Wrangell's Land, and of penetrating, if possible, as far as the Pole. This expedition is due to the munificent liberality of our associate, Mr. James Gordon Bennett, and it is gratifying to be able to state that when the *Jeanette* was last heard from the indications were favorable as to the result of the expedition. In the early part of last September she was seen by Captain W. M. Barnes, of the whaler *Sea Breeze*, in the vicinity of Herald Island, and probably reached Wrangell's Land, as it appears from the statement of Captain Kelly, of the whaler *Dawn*, who saw the smoke of the *Jeanette*, that the ice gave way and disappeared in a remarkable manner in October, so that, on the 7th of that month, he saw Wrangell's Land at a distance of about twenty-five miles, without any ice between his vessel and that Land. The coast-line of Wrangell's Land, as he saw it, showed very little snow, but the mountains in the interior were covered with it, and it was his impression that the *Jeanette* would undoubtedly reach there. When he last saw the *Jeanette*, on September 3d, she was tacking east and west, directly south of Herald Island, making her way a little to the east, and from the point where he last saw her she could, he says, have reached Wrangle's Land in twelve hours, with open water.

NORDENSKJOLD'S EXPEDITION.

The greatest event in the Arctic, during the period under examination, was the accomplishing of the northwest passage around Asia, by Professor Nordenskjöld. The object of this expedition was not only to accomplish what had been attempted so many times without success, from the first expedition of Willoughby, in 1553, but also the acquisition of important scientific information, it being now the opinion of meteorologists that the climate of Europe and America is materially affected by the ever-changing ice and other physical conditions of the Siberian seas, and that we will never get a thorough understanding of the laws which regulate the movements of the winds and the great currents of the sea until we obtain a more thorough knowledge of the state of things in the polar basin.

The conclusion arrived at at the Polar Congress, recently held at Hamburg, was that the information to be obtained in that region is of the greatest practical importance, and that nothing will satisfy the present requirements of science but the ultimate establishment of fixed points of observation around the Polar basin as near to the Pole as possible; and this opinion is not confined to meteorologists, but has been expressed by eminent men in various departments of the physical sciences.

The success of Professor Nordenskjöld in achieving this long-sought passage was due to the fact that he is himself an eminent scientific man; that he had a large experience previously in Polar exploration, and that before undertaking this expedition he carefully studied everything that had been done, from the first attempt, in the reign of Elizabeth, down to the last expedition. Not only was he possessed of all the historical and scientific information of the past, but the expedition was conceived, planned and carried out upon the most rigid scientific method. So far as the dimensions of the vessel would allow, she was thoroughly equipped with scientific apparatus of various kinds, and with an efficient corps of scientific men to assist the distinguished leader in the acquisition of all the information that could be obtained. The vessel left Gothenberg on July 4, 1878, for Tromsoe, in Norway, where the final outfit of furs and other things necessary in Arctic regions were obtained. Here she was joined by the companion vessel, *The Lena*, and on July 25th both vessels sailed and passed through the Yugor Straits, south of Nova Zembla, on August 5th, without any obstruction from ice between Weigatz and the continent. The Kara Sea was found equally free from ice, and both vessels sailed without any obstruction to Port Dickson, a little east of the mouth of the Yenissei, which they reached on August 6th. Here both vessels sailed for Cape Taimyr, where their progress was first arrested by the ice, and where they were compelled to remain for several days in a fine harbor between Taimyr Island and the mainland. The country was found covered with mosses and lichens, and although offering better pasturage for reindeer than the valleys of Spitzbergen, where reindeer abound, the animal was scarce and very shy, which was attributed to the presence of wolves. On the 19th of August they weighed anchor, sailing along the peninsula, and reached Cape Chelyuskin, the northernmost point of Asia, which was discovered in a land-sledge journey, in 1742, by a Russian lieutenant, whose name it bears. They doubled the Cape, ran into a creek or little bay on the eastern side of it, and having now achieved what had been attempted in vain for more than three centuries, they ran up the flags and fired a salute, whilst a large polar bear, the only inhabitant, stood looking at them from the shore. When the mist cleared away, Cape Chelyuskin lay before them free from snow. They landed and remained sufficiently long to fix the position of the cape astronomically, which, on the western of its two promontories, was found to be 77° 36′ 37″ N. lat., and 103° 25′ W. long.

The plains were of a clay formation, and some of them were nearly bare, while others were clothed with vegetation, consisting of grass, moss or lichens. The strata of the rocks were upright, devoid of fossils, and on the outer promontory there was a strata of slate crossed by large veins of quartz. Animal life was scarce; a few birds were seen, a large flock of barnacle geese, a few eider ducks, and traces of owls. Vegetable life was equally meagre. In the sea about them they saw walrus, a few seals, two shoals of white whales, and the dredge brought up large algea and a number of minute animals. On the 20th of August they sailed from Cape Chelyuskin in a southeast direction, in the expectation of discovering a western continuation of the group of islands known as the Liakoff Islands or New Siberia, but a dense fog and the pressure of drift ice prevented them making any further progress due east, and they were compelled to take a more southerly course, the breeze carrying the vessel swiftly over a smooth sea. The mountains along the coast, which were from two to three thousand feet in height, were free from snow, and in the water animal life was abundant, with a rich variety of creatures, indigenous to the Arctic seas.

They were now sailing over an area which is marked on the maps as land, and on the 24th of August they reached Preobraschensky, in the mouth of the Gulf of Chatanga, which was found 4° east of its position on the maps. From here, as the darkness came early, they had to proceed with great care, as the coast line on the map was not to be relied upon, and the sea was shallow, but they had the advantage of magnificent weather and a sea free from ice, which was attributed to the mass of warm water poured into it during the summer from the great Siberian rivers. Constant observations made as to the temperature and saltness of the water at different depths showed that a warm surface current runs from the mouths of the Obi and the Yennessei in a northeast direction, and afterwards is bent by the rotation of the earth more to the east. The warm waters discharged by the various rivers from the Chatanga to the Kolyma renders this sea for a short period of the year almost free from ice along the coast, confirming the impression that Nordenskjöld had formed, which led him to believe that a passage could be effected by water. The original plan of the voyage was to have anchored at the mouth of the Lena, but there being a favorable wind and the sea free from ice, he continued eastward with the *Vega*, and parted company with the *Lena*, his companion vessel, which went up the river to Yakutz. Nordenskjöld wished to land on Liakoff Island, the most southerly of the New Siberian group, to collect mammoth and other fossil remains, and the vessel's course was set for that island's western shore, but this he was unable to do from the obstruction caused by the great fields of ice that skirt the shores of this group. He therefore continued on to the mouth of the Kolmya river, which was found open, and continued to press eastward to Wrangell's Land, which has always been an object to explore from the statement made heretofore by the natives of Cape Yakan that they had seen people in the winter, unknown to them, coming over the ice in that direction from the northeast and returning the same way; but Nordenskjöld found his way towards the northeast barred by drift ice, and had to change his course to the west, reaching Cape Baranoff, from whence he kept along the coast, and on the 6th of September sighted Cape Shelagskoi, to the east of which point they first saw natives, who came rowing towards them in two sealskin boats, but from whom they could get no information, as they spoke no language but Tchuktchis; and after this they passed one or more native villages, receiving visits from the natives, who were kindly. They rounded Cape Shelagskoi, and on the 12th of September arrived at North Cape, where they were detained by the ice six days. Here, in a shallow bay, was a Tchuktchi village, the chief of which visited them, and is described as a particularly attractive man. He and his wife were taken into the saloon of the *Vega*, where they were astonished at what they saw. He showed great delight at a performance on the barrel organ, commencing at first to quiver at every limb, but soon dancing most vigorously, and he spent hours contemplating his brown yellow face in a mirror.

They succeeded in getting about fifty miles further, but at last, on the 28th of September, the vessel was imprisoned in the ice, near a Tchuktchi settlement, in 67° 7″ N. lat., 173° 30′ W. long., where they remained for two hundred and sixty-four days.

The point where the vessel lay is off Cape Serdze, about one hundred and twenty miles from the Pacific termination of Behring's Straits. The sea in this part of the Arctic is generally open, vessels engaged in sealing and whaling north of Behring's Strait sailing thereabout in every direction; but, unfortunately for the explorers, this appears to have been an exceptional year. The chief difficulty they had anticipated was in passing Cape Chelyuskin, whereas their real obstacle was found off a part of the coast where it was least suspected. The natives, the Tchuktche, are comparatively new occupants of the country, who at some former period drove away a more civilized race. They resemble the Esquimaux and the Mongolians, but they did not understand Russian, nor any other of the languages known to the explorers. They are a people of small stature, although some are tall, one woman they saw being six feet three inches in height. They have black hair, black eyes, brown-yellowish complexion; are clothed in reindeer skins; live chiefly by fishing; use stone and bone implements, and they traverse with their sledges great distances, one of them departing whilst the explorers were there on a journey with his sledge to the mouth of the Kolyma, seven hundred miles away.

The natives, men, women and children, came constantly to the vessel during the time that the *Vega* remained there, and were allowed to roam freely over the deck, which was crowded with articles, and yet nothing was ever missed. The ship was also visited by Menka, the chief of the reindeer Tchuktches, by whom the letters were sent which ultimately reached Europe. A little incident is worth mentioning, as showing what the savage as well as the civilized man will do in the matter of self-importance. After the chief went on shore, he assembled the natives around him, when he unfolded the letters, and holding them upside down, read apparently from them long sentences in the Tchuktch language, to an audience devoutly impressed with his great learning.

On the 18th of July, 1879, the vessel was released, and on the 2d of September following reached Yokohama, in Japan. The coast from the River Lena to Behring's Straits was found to be correctly placed on the charts; but the previous coast line from the Yennissei to the Lena was so badly laid down that the *Vega* and her companion vessel sailed for nearly three hundred miles over what on the latest charts is represented as land.

My limits will not admit of my giving further details. I can only mention the conclusions to which Nordenskjöld has arrived from the results of the expedition, which are, that the voyage from the Atlantic to the Pacific around the north coast of Asia may be made by a suitable steamer in a few weeks at the proper season, but that the route is not likely to be of any practical commercial importance; that there is no difficulty in establishing a regular communication by water between the rivers Obi and the Yenessei and Europe for the purpose of trade; that in all probability the voyage by sea between the Yenessei and Lena, and between the Lena and Europe, may be utilized for the purposes of commerce; that the voyage there and therefrom may be made in the same summer; and that further explorations are necessary to determine whether a practicable communication by water can be established from the River Lena to the Pacific.

THE SIR JOHN FRANKLIN SEARCH EXPEDITION.

The *Eöthen* landed near Depot island, in the north of Hudson's Bay, on the 9th of August, 1878, Lieutenant Schwatka, Colonel H. Gilder, Esquimaux Joe and the other members of the expedition for the discovery of some remains of Sir John Franklin's expedition, supposed to include the journals, reported by two Netchelli Esquimaux to exist on an island in the Gulf of Boothia. The expedition found upon their arrival that the principal Netchelli who gave this information to Captain Barry and offered to go with him to the island was dead, and the other, who had left the Netchelli when he was young, knew only of the Franklin expedition by hearsay. In the fall of 1878 Lieutenant Schwatka surveyed the coast from Baker's Foreland to Cape Fullerton, which is erroneously laid down on the present charts, having a totally different curvature, with two rivers flowing into it and a bay at the north. In the spring they made a sledge journey to King William's

Land by way of a river, to which they gave the name of Connery river, after the assistant editor of the *New York Herald.* Another river running northwest for an estimated distance of about ninety-five to one hundred miles was discovered by Colonel Gilder in a land journey on the following August, and named by him Lorillard river. A large lake was also discovered about fifty miles long, and named Brevoort lake, after our associate and councilor, J. Carson Brevoort, Esq. This is the substance of the information of a letter received by me from Lieutenant Schwatka, accompanied by drawings of their encampment and surrounding country and a map of the coast surveyed.

WINTERING IN NOVA ZEMBLA.

A Russian settlement was established in August, 1878, in the harbor of Karmakul, in Nova Zembla, for the relief of shipwrecked mariners and for meteorological observations, which consisted of a colony of Samoyedes, under M. Tjagin. M. Tjagin remained with the colony until the summer of 1879, when he returned to Archangel. Moller Bay did not freeze during the whole winter except among the islands along the coasts. M. Tjagin states that wintering in Nova Zembla is quite practicable, especially for Samoyedes, and that this refuge station or settlement can undoubtedly be maintained.

BRITISH AMERICA.

The survey of the northern boundary line between the United States and the possessions of Great Britain, which I described in my annual address in 1877, has been completed. This survey extended from the farthest northern point of the Lake of the Woods to the summit of the Rocky Mountains; the line from the Atlantic to the northwest angle of the Lake of the Woods and from the summit of the Rocky Mountains to the Georgia Strait having been previously surveyed and adjusted between the two governments. The survey of the intermediate or connecting line between the Lake of the Woods and the summit of the Rocky Mountains has been carried on since 1872 by Mr. Archibald Campbell, on the part of the United States, and by Major William J. Twining, U.S.E., as chief astronomer; and the completion of the line has been fixed by forty astronomical stations, three hundred and eighty-eight monuments, and by thirty-four maps on a scale of an inch to every two miles.

UNITED STATES.

The geographical work in the United States of the Coast Survey, of the Navy Department and of the United States Corps of Engineers has been continued as in previous years. The engineer corps, which is chiefly devoted to valuable work in the improvement of harbors and rivers, embrace details too numerous to refer to in an address like this, which is also the case with much of the detailed work of the coast survey. One part of it, however, may be particularly mentioned.

PROFESSOR A. AGASSIZ' DREDGING IN THE CARIBBEAN SEA.

Professor A. Agassiz was engaged in 1878 and 1879, in the United States steamer *Blake*, in dredging and taking soundings in the Caribbean Sea, along the islands of Cuba, Jamaica, St. Domingo, Porto Rico, the Windward Islands, the Leeward Islands, and the islands between Costa Rica and Jamaica. His report of the result is of interest not only to naturalists, but to geographers, as showing the changes that have taken place in the form and distribution of lands along these various groups of islands and in the form of the land beneath the waters. Jamaica was found to be only the northern spit of a gigantic promontory which once extended towards Hayti from the mainland, reaching from Costa Rica to the northern part of the Mosquito coast. The affinity of the fauna of Cuba, the Bahamas, Hayti and Porto Rico, notwithstanding the near proximity of these islands to Florida, was found not to be with the southern part of the United States, but with Mexico, Honduras and Central America. At a depth of 500 fathoms a gigantic spit, extending northerly, unites all the islands from the mouth of the Orinoco, south of Martinique. The investigation showed that at a former period Central America and northern South America must have been a series of large islands, and the Caribbean Sea either a gulf of the Pacific or connected with it through inside passages. Professor Agassiz was able from the soundings to trace the outlines of a former extension of the South American continent with tolerable accuracy, and the examination, he states, shows that it is incredible, with the huge mass of waters pouring into the Gulf of Mexico, that there should be a cold current forcing its way up hill into the Straits of Florida, as has been heretofore theoretically assumed.

GEOGRAPHICAL WORK OF THE U. S. NAVY DEPARTMENT.

The survey of the Pacific coast off Guatemala has been carried on by Commander J. W. Philip, U. S. N., in the U. S. Steamer *Tuscarora*, and will be completed next season.

In pursuance of the plan of accurately determining a large number of secondary meridians of longitude by means of the telegraph cables, Lieutenant-Commanders F. M. Green and C. H. Davis, U. S. Navy, have, under the direction of the Bureau of Navigation, extended a chain of measurements from the Greenwich meridian by way of Lisbon, Madeira, the Cape de Verde Islands, Pernambuco, Bahia, Rio de Janeiro, and Montevideo, to Buenos Ayres, connecting there with the measurement made by Dr. Gould across South America to Santiago and Valparaiso. In each case the latitude has been established by the zenith telescope, and the longitude by telegraphic exchange of time signals. A similar measurement was made from Pernambuco by way of Maranham to Para. This chain of longitudes is the longest ever measured in this way, and the results will be shortly published.

One rather unexpected result, but which has been established beyond doubt, is the demonstration that the city of Lisbon, and, indeed, the whole coast of Portugal, should be laid down on the charts considerably more than two minutes of longitude to the westward of its present place.

GEOLOGICAL AND GEOGRAPHICAL SURVEY OF THE WESTERN TERRITORIES.

The extensive and valuable surveys of our Western territories, which was formerly carried on either by the War Department or as distinct and separate surveys, severally known as Hayden's, Powell's or other names of the military officers or civilians conducting them, have been reorganized by an Act of Congress, and under the Department of the Interior are now included in one bureau, which, by the appointment of the President, has been placed in charge of our associate and member of our Council, Clarence King, Esq. Since this change and during the past year the bureau has been chiefly engaged in preparing and publishing the results of the mass of material collected in preceding years, the field events of the last year having been limited to the department of economical geology, the desire for information of this description in the interest of mining being very great. The maps recently issued by the Departments of War and of the Interior may be noted as marking an era in the geographical knowledge of our great Western region, and the information they have afforded for the last six months, judged by its results, is alone worth their whole cost.

PROFESSOR HAYDEN'S SURVEY.

The geographical events of 1878 may be briefly stated. Mr. W. H. Gannett made a detailed and careful survey of the Yellowstone National Park. The mean elevation was found to be between 7,000 and 8,000 feet, and the whole park was covered with a dense growth of magnificent pines. Grazing land exists only on the northern border and in small patches, no mines or mineral deposits were found, and the temperature is such as not to admit of agriculture, except in certain localities. Mr. Bates Holmes, the geologist of one of the divisions, sketched every square mile of the park in detail. All the geysers, hot springs and mud volcanoes were recorded. The geyser named "Old Faithful," the largest of them, was again examined by Professor Hayden to see if the phenomenon had developed any new features. This geyser, in intervals of an hour, projects a stream of hot water 200 feet into the air. It was found still subject to hourly irruptions, the intervals of irruptions occurring as regularly they state "as the tick of a clock." Other divisions of the survey examined the adjacent country. The party having charge of the primary triangulations covered during the season an area of about eighty thousand square miles, and the height of over one hundred and fifty mountain peaks were determined, the highest ones being from ten thousand to fourteen thousand feet; Fremont Peak and Mount Washington were found to be the two highest.

This expedition had to endure many hardships, and were at times in extreme peril in crossing the swift mountain streams. Wild game abounded, and the men could sit by their camp fires and shoot moose, elk, deer and bears. The grand canon of the Yellowstone was also again explored by Professor Hayden. The gorge is three thousand feet deep, the walls being almost perpendicular, and at the bottom of the chasm it is so dark that the stars are plainly visible at every hour of the day. The loneliness is described as oppressive. There are numerous waterfalls, the lower fall having a plunge of four hundred feet, and the three next in height of about one hundred feet each.

LIEUTENANT WHEELER'S EXPLORATION IN NEVADA AND OREGON.

Lieutenant Wheeler, in 1878, explored Pyramid Lake, in Nevada, which receives the Tuckea river. The lake, which is about forty miles long, has no visible outlet, is of great depth, is conspicuous for its surroundings of immense columnar rock, and is the least known of the North American lakes. The question stiill remains an unsettled one whether there is a subterranean drainage in this part of Northwestern Nevada, or whether, under the dry climate, the water evaporates in the valley. Lieutenant Wheeler crossed the arid volcanic Oregon desert to the alkaline Lake Albert, where he and his party narrowly escaped an Indian attack. He visited Klamath Lake, which presented the same physical features as Pyramid Lake, and evidently belongs to the great Basin Plateau. Here the party divided, and Lieutenant Wheeler explored the Cascade range, parallel to the Pacific coast, carrying from St. Symonds the triangulation to the north. Mount Pitt, which was found to be four thousand feet above the level of the country, and ten thousand above the sea, was scaled with great difficulty, from the lava, fallen timber, rock slides, &c. From another peak Crater Lake was seen, confined within vertical cliffs two thousand feet high, its area being about fifty miles, and there was evidence of recent volcanic action. The explorers proceeded northward, finding innumerable small lakes, when their further progress on the mountain crest was stopped by dense forests, thousands of acres of which are set on fire by the Indians when they are pursuing game. Desschute's river was also examined. It was found to be a turbulent stream, percolating through piled-up masses of lava, and one which can never be navigated from its numerous rapids and cascades. Mr. Walker ascended Mount Hood, twelve thousand feet high. He found, far above the snow line, that hot steam issued from the craters on its side, and five hundred feet from the top there was a large basin, the main crater of which gave out sulphurous steam, and other craters and huge glaciers were seen on the southeast side. The result of this exploration is that the capabilities of Oregon west of the Cascade Mountains are very good, and although to the east of that range the rainfall is limited, the land is fertile in the Desschutes basin, and the supply of water for irrigation plentiful.

THE HENRY MOUNTAINS.

The Henry Mountains of South Utah, discovered by Professor Powell ten years ago, have been surveyed by Mr. G. K. Gilbert. The mountains, which are from 11,250 to 7,750 feet high, are not a range and have no trend, but are simply a group of five individual mountains separated from each other by low passes, and are embraced in a radius of eighteen miles. They stand upon an arid, rugged and desolate plain, deeply cut up with cañons, and almost on the brink of the Colorado river, which here flows below them at a depth of 1,500 feet.

Being so far above the surface of the arid plain on which they stand, they act as local condensers of moisture, getting such a supply of rain that their upper slopes are covered with luxuriant vegetation and growths of timber. Being so remotely situated, however, in an arid region, deeply carved in cañons, they are of no economic value for agricultural purposes, and have no mines, but are of great interest to the geologist from their position in this wonderful region, and the facility with which they can be examined.

Mr. Gilbert's report is exceedingly interesting and valuable in explaining the causes which brought about the extraordinary formation of the land in this part of the west, through which the rocks have been sculptured into their present shape, upon the law of divides and the influence of the rotation of the earth in deflecting the course of rivers. He believes as the result of this examination that the carving of the cliffs of the Colorado basin is not owing to mightier rains than we have now, but to an extremely arid climate, existing for ages. He thinks that the Saskatchewan river, which rises in the Rocky mountains, was formerly the upper course of the Mississippi, and flowed to the Gulf of Mexico, until, by the rising of the land in Minnesota, a barrier was created, which changed the course of the river, and by which Lake Winnipeg came into existence; and equally interesting are the views of Captain C. E. Dutton as to the manner in which the Colorado river originated, as the deepest part of a previously existing Tertian sea.

LANDS OF THE ARID REGION OF THE WEST.

Professor J. W. Powell has transmitted to the government a report on the lands of the arid regions of the United States, west of the one-hundredth meridian and east of the Cascade range, which is not only descriptive of the general features of this region, but contains an exposition of the conditions under which these lands may be redeemed from their present excessive aridity and utilised for agricultural purposes.

It appears by this report that the abundant rainfall in the eastern portion of the United States diminishes westward, until at last an arid region is reached, in which agriculture is not possible without irrigation. This region, Professor Powell says, begins about midway in the great plains and extends across the Rocky mountains to the Pacific ocean, except that there is a greater precipitation of moisture in Western Washington and Oregon and the northwest corner of California, the winds impinging on this region being freighted with moisture, derived from the great Pacific currents, and where this water-laden atmosphere strikes the western coast in full force, as it does in the vicinity of the Columbia river, the precipitation is excessive, but rapidly decreases eastward to the summit of the Cascade mountains, this humid area being designated by the Professor as the Lower Columbia region. The especially arid portion is the great Rocky mountain region of the United States, and embraces more than four-tenths of the whole country, excluding Alaska.

My limits will not permit a further examination of this very interesting and important report, which points out what must be done by legislation to redeem a great part of this now worthless region, which cannot be accomplished simply by the efforts of individuals, but requires the adoption by the government of a general land system, organizing pasturage and irrigation districts, with provisions regulating water-rights connected with the land and the manner in which the waters are to be used to accomplish the general purposes of irrigation.

CALIFORNIA.

M. A. Pinard has explored a little-known tract of country in Sonora, at the bottom of the Gulf of California.

A section of a tree, the largest found in California, has been exhibited in this city. The tree is two hundred and forty feet high, and is computed to have been four thousand eight hundred and forty years old. The section exhibited was seventy-five feet in circumference, twenty-five feet across, and was capable of holding one hundred and fifty people. The interior was fitted up like a drawing-room, with a piano, a sofa, tables, and chairs. The tree grew near Tule river, Tulare county, California.

A NEW SURVEY OF THE MISSISSIPPI RIVER.

Mr. W. A. Wheeler has called attention, through the columns of the *Boston Globe*, to the necessity of a more extensive and thorough survey of the Mississippi river. In reference to the bill introduced in Congress for the survey of the region between the Upper Missouri and the Upper Columbia, he urges that the water-courses of this continent can be directed to the north coast of it; that the Mississippi can be virtually extended to Lancaster Sound, and give us an open water-way from the Gulf of Mexico far to the north of our present navigable limits. He says that the mouth of the Mississippi is the gateway to about fifteen thousand miles of water-way, and that there are avenues that lead to almost as many more, if a survey adequate to the future wants of the country were made.

SURVEY OF THE STATE OF NEW YORK.

Mr. J. T. Gardner has continued the survey of the State of New York, authorized by the Legislature, fixing the exact position of cities and villages in the most populated part of the State, and has found in nearly every instance that places were misplaced one or two miles on the existing maps. In respect to the general features of the country over which the survey has extended, Mr. Gardner says, "Colorado was not a greater surprise to me than has been the structure of my native State." He says that the study of its most remarkable features will awaken the deepest interest; that the configuration of a part of Central New York is as *unique and as unknown to science as that of any part of the Rocky Mountains.*

A more complete survey of the Adirondack region of the State has been made under an Act of the Legislature by Mr. Verplanck Colvin, with an efficient scientific corps. More than twenty-five of the high mountain peaks were measured, and hundreds of miles of levels were completed, positions were located, stone monuments set, and a number of fine photographs were taken of remarkable places.

RAILROAD INCREASE IN THE UNITED STATES.

During the last two years 7,346 miles of railroad have been added in the United States, making the entire number of miles of railroad in it, 86,263—nearly one-half of the entire railroad mileage of the world.

WEST INDIES, CENTRAL AND SOUTH AMERICA.

WEST INDIES.

Mr. F. A. Hober, of Massachusetts, has spent some time among the islands of the Caribbean Sea, and devoted two months to the investigation of the Caribs, an interesting remnant of the aboriginal tribes of the American continent. In one or two of the smaller islands he found remnants of this people, now almost extinct, who were a powerful race upon the discovery of America. They were cannibals, and a strong and warlike tribe, when they were discovered by Columbus, making constant forays upon the neighboring islands and tribes, often to a distance of one hundred and fifty leagues, in their canoes, carrying off the handsomest women for wives and eating the men whom they took prisoners. To the Spaniards they were so formidable that they never attempted to enslave them. The remnant now found by Mr. Hober were a simple, indolent, happy people, the number among them of pure blood being very small. He describes them as a yellowish-brown race, with long straight hair, well formed in youth, but in age corpulent, the women marrying very young and getting old and wrinkled at an early period. He found, as other travelers have, that the women had one dialect and the men another, each being perfectly intelligible to the other. He describes them further as very superstitious, and as having some dim conception of the Supreme Being and a vague idea of a future state.

Mr. F. Ober, who had been sent out by the Smithsonian Institution, brought to a close, in 1878, his examination of the islands of the Lesser Antilles, which embraced a thorough examination of Martinique and other islands of the Windward and Leeward groups. In the larger and more mountainous islands, he observed in ascending the volcano peaks three zones of vegetation, each zone distinguished by a different class of birds. In a retired part of the Island of Dominica he found a remnant of the aboriginal Carib race; and also visited the Caribs in St. Vincent, bringing back specimens of their ancient utensils, and taking photographs of their rock drawings and inscriptions.

Mr. Henry Fowler made a journey across the unexplored portion of British Honduras, but with no very important geographical results, passing through a rugged, hilly country, covered with dense forests.

INTEROCEANIC CANAL.

M. de Lesseps, with a corps of distinguished engineers has visited the Isthmus of Panama and re-examined the route for a sea-level ship canal from Aspinwall to Panama. The report of the engineers is that such a canal can be constructed for 180 millions of dollars, and that the serious obstacle of the close proximity of the river Chagres to the line of the canal and the river's rising at times along the line of the present railroad to a height of 40 feet, can be obviated by the construction of a dam 100 feet in height, by which the course of the river will be diverted in a different direction, and that the canal can be carried through the rocky ridge which crosses the isthmus by an open cutting.

It will be unnecessary for me to say anything further, as the whole subject of the canal and of the various routes has recently been elaborately discussed before the Society in five sittings, specially devoted to that subject, embracing a full consideration of the advantages and disadvantages of each of the several routes, by a number of distinguished gentlemen thoroughly informed upon all the questions, many of them eminent engineers; the whole of which discussion was taken down, is now being printed, and will be issued in the Society's Bulletin in a few days.

FRENCH GUIANA.

Dr. J. Crevaux, a French traveler, explored the interior of French Guiana. He ascended the Oyapok to its sources, and from thence crossed to the Tumac-humac range of mountains, which form the water-parting between the rivers of French Guiana and the Amazons. He was not only successful in crossing the mountain range referred to, but was the first explorer that had been able to approach it for three centuries, and in his journey from Cayenne to the Amazons he passed through two hundred and twenty-five miles of an unexplored region. In a remarkably short space of time he continued his journey up the Amazons, ascending the main Amazons to the mouth of the Iça, and up that river, which is but little known, to its headwaters, crossing from there to the city of Pasto, on the Andes, and returning by the River Japura to the main Amazons. His entire route embraced four thousand miles, nearly one-half of which was along rivers, passing through regions inhabited only by Indians.

COL. ROBERTS' SURVEY OF THE ST. FRANCISCO RIVER.

Our associate, Mr. W. Milnor Roberts, now the chief of the Brazilian Railways, has surveyed the St. Francisco River in Brazil, from its mouth to its headwaters, completing his labors last January. It is, he says, in a letter received at our Society, a very peculiar river, one thousand three hundred and two miles long from the ocean to the Falls of Perapora, and is one-half wider than the Ohio at Cincinnati, with a large volume of water at the lowest stage of the river. Two hundred miles from its mouth are the great Falls of Paulo Alfonso, with a higher elevation than the Falls of Niagara, though not, like Niagara, in one pitch. A railway is required seventy-five miles to connect the lower and upper rivers, which is now, he says, in the course of construction by the Brazilian government. About two hundred and sixty miles of the river has many rapids, all of which he ascended, and after this there are, he says, about eight hundred miles of fair navigation for light steamers.

SURVEY OF THE AMAZONS.

Commander Selfridge, U. S. N., was dispatched by the United States government to obtain accurate hydrographical knowledge of the lower course of the Madeira, the great affluent of the Amazon. The result of this survey, in which was included a tract survey of the lower Amazons as far as the mouth of the Madeira, is an excellent chart of the Lower Madeira for a distance of five hundred and seventy-eight miles to the Falls of St. Antonio, where the further navigation of the river is obstructed. The survey occupied about three months. Careful soundings were taken every few hundred feet, the result of which showed that the river can be navigated by steamers of eighteen feet draught for the distance stated up to the middle of July.

PATAGONIA.

Don Raymond Lista made an exploration in Southern Patagonia for the purpose of discovering the sources of the

River Chico. The expedition started from Puentas Arenas, in the Straits of Magellan, and the explorers, after studying the mineral products in that immediate vicinity, started upon their northern journey. The two northern sources of the Chico were examined, and afterward the southern source was explored. The large average stature of the Patagonians is confirmed by this exploration.

Signor Moreno, to whose explorations in Patagonia I referred in my address of 1878, declares that Magellan's Straits offer many advantages for settlement; that if these coasts were populated disasters from shipwreck would be greatly reduced, and that Patagonia, from Bahia-Blanca, has an excellent climate, and everything required for a great producing country. The last intelligence of this enterprising explorer was, that he had been captured by the Indians in Northern Patagonia. An English party, one of whom was Lady Florence Dixie, explored a considerable portion of the wild Pampas of Patagonia, penetrating into the Cordilleras. Parts of the region explored by this enterprising lady and her companions had never before been visited by civilized man.

DR. FINSCH'S EXPLORATIONS IN THE NORTH PACIFIC.

Dr. Finsch is exploring the less known islands of the Northern Pacific, chiefly with reference to natural history and ethnology.

EUROPE.

The Russian Government has been actively engaged in surveying the great rivers within its European boundaries. The Volga has been surveyed for seven hundred and seventy-five miles; the Chussowerga, one of the branches of the Kama, for two hundred and seventy miles; the Byclaya, another branch of the Kama, for one hundred and sixty miles; the Don for five hundred and sixty miles, and the Byalka river was entirely surveyed.

The Italian Government instituted a general triangulation of the whole kingdom for a large and complete map of Italy, which commenced with Piedmont. With this triangulation was also connected a hydrographic survey, and in this branch the whole of the north of the Adriatic coast was completed, and the survey has been extended to Calobria, Sicily and Northern Sardinia.

ASIA.

NORTHERN ASIA.

The geographical explorations in Asia, especially in the northern part of it and in the countries now under the control of the Russians, have been very extensive. The Oxus, or Amu Daria, has been examined, and was found navigable throughout the entire length of the journey of the explorers, which was about one thousand miles. Little wood and but few inhabitants were found upon its banks, and in severe winters it is frozen over. Baron Amiroff surveyed the water-parting between the rivers Obi and Yenissei, and established the feasibility of uniting these important rivers. Explorations were made by M. Yadvinlseff in the South Altai Range; by M. Slovtsoff, in the region of Akinolinsk; by Mr. Mathieu, in Badakhshan; by Mr. Potanin, in the Hau-Kai mountains, near Lake Kasso-Gal, and by Mr. Pevtsofs, in northwest Mongolia. Colonel Grodekoff surveyed a route from the Oxus to Herat, and a new route has been discovered from the Caspian to the Sea of Aral, the principal part of which is by water—a very important discovery, as it is shorter by one-half than the previous route by the way of Orenburgh, M. Oschanin explored a part of the country of the Pamir, and made an attempt to cross the Pamir Steppes, in which he failed.

MOUNT ARARAT.

Mr. I. Brice succeeded in ascending to the top of Mount Ararat. He found the mountain mass to be about twenty-five miles long, from twelve to fourteen miles wide, and the circumference from seventy to eighty miles, the whole forming two peaks, joined by a sort of neck; the larger of the two, or Great Ararat, rising to a height of seventeen thousand feet above the level of the sea. Mr. Brice ascended the mountain, the ascent of which was so difficult that his assistants refused to follow him, and he reached the top alone. The upper part of the mountain was without snow or vegetation, although the mountain is surrounded by snow to the height of eleven thousand feet. When he reached the summit two strong blasts of wind swept away the clouds, and the view he obtained, he says, was "wonderfully grand and extensive." He describes Armenia as very barren and of great elevation, no part being less than two thousand five hundred feet above the sea. The climate, he states, is extremely hot and dry in summer and intensely cold in winter,. He considers the Armenians the most hopeful and vigorous race in the East. They have retained, he says, their nationality and character through a thousand persecutions and wars, and, as a race, now show exraordinary aptitude for commerce and the work of civil government.

ROCK CITY, IN ARABIA.

Mr. C. Doughty visited the so-called rock city of El-Heggi, beyond Damascus, which, in the days of Ptolemy, was an emporium for trade in frankincense and gold. It is one of the seven fabled cities of the Arabs, which was said by them to have been hewn out of the surrounding mountains, and to have had one hundred funereal chambers excavated in the rock. Mr. Doughty reached the place with great difficulty, and found it to consist only of the remains of what appeared to have been four or five palm villages, each surrounded by a wall in the ordinary Arab manner. He discovered some sepulchral chambers, but they were very plain, with inscriptions cut in a panel over the doorways. This journey of Mr. Doughty has entirely dissipated the fabulous stories so long told about this place by Arab, Turkish and Persian pilgrims.

PERSIA.

Dr. Bastian, formerly President of the Berlin Geographical Society, and who, a few years ago, visited this city, has made a journey through Persia, the Padang islands and Java, with especial reference to ethnological researches; and Mr. N. A. Marieff has made a journey in the mountainous part of Southern Bokhara, finding mountain streams hitherto unknown.

An ancient canal, which formerly extended from the Euphrates to the Tigris, had silted up. The ancients, in cutting this canal to connect the Euphrates with the Tigris, cut it with an upward course, contrary to the flow of the Euphrates. It would have been comparatively easy to have dug out the old canal, instead of which, however, a new one was cut last year, in which the precautionary measure of the ancients was not followed, and, in consequence, the whole force of the Euphrates was thrown into the new canal, producing an immense overflow towards the Tigris, inundating hundreds of acres of valuable cultivated land. It is extraordinary that they should have so cut the canal with the example of the direction of the old one before them, but it is a characteristic illustration of the way in which things are done in the East under Mohometan rule.

AFGHANISTAN.

In connection with the English military occupation of Afghanistan, there has been considerable geographical work. Several expeditions have been despatched to obtain accurate information for a topographical map of the country as far as Cabul, and with the expectation that sufficient material may be collected to construct a map of the almost unknown region of Kafaristan.

Captains R. G. Woodthorp and G. Martin, and Lieutenant M. Smith, who were attached to the expeditionary military force for geographical purposes, surveyed the whole of the Kuram Valley and the district of Khost to the south, making an addition to our present geographical knowledge of four thousand five hundred square miles. Captain R. Beaven has given a description of the country between Candahar and Girishk, which was traversed by the military division, under the command of Major-General Biddulph, in the early part of 1879. Lieutenant St. George C. Gore has described the Pishin valley, now annexed by the British government, about forty-eight miles long, and from twenty-five to thirty wide; and Major Campbell, the Shorawak valley, a narrow strip of flat country, about forty miles long and ten wide, which had never before been visited by Europeans; and Captain Holdich has given a description of some new routes to Candahar. One of the results of the military expeditions is, that the hitherto unknown region between the Pishin valley and the Suliman range, is open, rich and fertile, with nothing to prevent travel across it in any direction.

The almost unknown country of Kaffiristan was partially examined by Major Tanner, who, in a brief account of his journey, mentions as one indication of an advanced civilization, the superiority of the women, who, in contra-distinction to Asiatic habits in general, mingle freely in ordinary intercourse with the men.

THIBET.

Count Szechenyo, the Hungarian traveler, made a journey from China through Thibet, and attempted to reach Lake

Lob Nor from the side of China, but was prevented by Chinese officials. When last heard from, he had tried to make his way to Lhasa, in Thibet, but was compelled to return.

A native Indian explorer has surveyed the river Sanpu, the great river of Thibet, which was so long confounded with the Brahmaputra. He surveyed it downward for two hundred miles to Chetang, where it entered some hills towards the south, which he was unable to penetrate. It may be mentioned, as creditable to the present state of geographical science, that its true course and direction was found by him to be in accordance with the conjectures of the geographers.

Colonel Prejevalsky, to whose previous explorations I have so frequently referred, traversed the eastern part of the desert of Gobi from north to south, by a route leading from Hami to Sch-Chau, through an unknown country, by the way of Shatsheu. He found that at one point the desert attained the height of five thousand feet. At the oasis of Sch-Chau, which he says is very fertile, the elevation was three thousand five hundred feet. South of this he found a long mountain range, covered with perpetual snow, which he inferred extended as far as Lake Lob Nor, or its vicinity. After passing the desert he reached Zaidam, on the borders of Thibet, his design being when last heard from to reach Lhassa, which so many travellers in Thibet have attempted to do without success. It is a dangerous route, and intelligence just received has created apprehensions in regard to his safety.

CHINA.

Expeditions and journeys for geographical and missionary objects in China have, within the period under review, been very numerous. Mr. G. J. Morrison visited the Yellow River, the remarkable change in the course of which I described in a former address. He found the country through which the river pursues its new course presenting a scene of the utmost desolation. He discovered that a portion of the river had changed since it was visited by Mr. Ney Ellis in 1872, and he declares that it is still changing, desolating the country through which it passes in these changes. He found that that portion of the grand canal which extends north of the Yellow River was completely dry. Mr. J. Cameron went from Pakhoi, in the extreme south of China, to Yunnan-Fu, and is, I believe, the first one who has made this journey. Some Belgian missionaries, with the Vicar Apostolic of the province of Kansu, made a journey across the extreme end of China, from Pekin to Louchow-Fu, the capital of Kansai; a portion of which was through parts of China almost unknown, and J. F. Brompton, a missionary, made a journey to Kweilan-Fu, which he found to be a large city, and a centre of commercial activity through its connection by water with Canton.

Rev. J. McCarthy went from Hankow to Bhamo, and has given a very interesting detailed account of his journey. Several years' experience, he says, confirmed a deeply rooted conviction that the truest protection for any one traveling among strangers is the knowledge on their part that he can do them no harm, and that the more he can make this apparent the better it will be for him and all that come after him. He found the large city of Yunan-Fu had formerly a suburb, of three miles in extent, the streets and houses of which, however, had been destroyed in the Mahometan rebellion ; the city itself, he states, is not more than three and a half miles around the walls, the population residing chiefly in the southern quarters of it, and that a large swampy lake fills a great portion of the northwestern part of the city. He found Momien situated in the centre of a large and fertile plain, surrounded by a low built wall, forming a square about two and a half miles long, and the city itself in a ruined condition. From Momien he went to

Bahmo, and found the Shans, of whom the Chinese speak so contemptuously, a comfortable, well-dressed, well-fed people, in marked contrast with the Chinese. "I travelled," he says, "purely as a missionary, but glad at the same time to obtain geographical information; and the more frequently foreigners travel among the people without exciting hostility, the sooner will a more scientific and thorough knowledge of the country be obtained." He walked nearly the whole journey, was continually before the eyes of the people, and during the whole of the long course of it was never called upon to produce his passport, and never had occasion to appeal to any official for help or protection. He travelled on foot nearly two thousand miles through the west of China, from Hankow to Bahmo, and has gathered a great deal of interesting geographical and ethnological information.

Mr. E. Colborne made a journey from Chung-King, in the Chinese province of Sze-Chuen, to Ta-Chien-Lu, in the course of which he passed through part of Thibet, and obtained a great deal of information regarding the countries included in the general name of Thibet.

M. de Ujfalvy, while traversing Central Asia, visited the land of the Galtchas, Sarts, and Sadjicks, a Mussulman people, living in the patriarchal state, who are polygamists, and by whom women are held in great subjection. The Galtchas, in their wanderings, ascend the mountain slopes of Kohistan, and are an interesting people, as they range over the country, which appears to have been the extreme limit of the Aryan race, and where now the white and yellow races meet and partially overlap each other. In the Kuldja district the oblique-eyed Mongolians begin to predominate. It is a very interesting field for ethnological inquiry, which was the main object of M. de Ugfalvy's journey and the account of his investigation, which he is now preparing for publication, will be looked for with great interest.

COREA.

It will be remembered that about nine years ago Lieut. Grinnell, U.S.N., the son of my predecessor in the office of President of our Society, gave us an interesting account of what he was able to collect respecting Corea, in a journey to the northern part of it from Russia, the southern and principal part of the country having been closed for more than two centuries against all intercourse with the outward world. He failed in getting further than the outward boundaries of Corea, visiting only a few villages, and predicted that the naval expedition then sent out by the American Government under Admiral Rodgers would have no better success than the Russians and the French in the attempt to enter the country, a prediction which was afterwards fullfilled.

Mr. Ernest Oppert has since made three voyages in a steamer to Corea, and upon the second voyage he discovered the mouth of the Kang-Kiang river, upon which the capital of Corea is situated, about seventy miles from the mouth. Mr. Oppert steamed up the river for forty miles, and would have continued on to Saoul, the capital, but for the shallowness of the water. The result of this bold attempt was that he had many interviews with the people as well as with the authorities, the regent having sent a commission to confer with him. His effort to establish commercial intercourse was not successful; but during the negotiations he made long journeys into the country, either alone or attended by a single companion, and approached within a few leagues of the capital. He found the people not at all disinclined to intercourse with strangers, but that the opposition proceeded entirely from the rulers, and he obtained a great deal of valuable information respecting the country, its institutions and people. There is a rigorous division, he says, of the Corean races into castes, but very different from what exists in India, for instead of the priesthood being one of the highest castes, they are one of the lowest. The ruling class are of the Aryan race, or, as he describes them, pure Caucassian; and he says if met in any city of Europe they would be taken for Europeans. The people are neither of Chinese nor of Japanese origin. They are taller and more powerful, with a caste of feature peculiarly pleasing, and those of the upper classes have luxuriant beards. As a people, he says, they are singularly honest, faithful, good-natured, firm and energetic. They have a great fondness for music, though their instruments are very primitive, and they are the only people, except the Phœnicians, who have invented an alphabet. There is no marriage ceremony; the bridegroom merely pays the stipulated price for his wife and takes her away with him. The women are kept in the greatest seclusion, but to indemnify them for this, a singular custom prevails. Every evening, at a certain hour, the city gates of the towns are closed at a given signal, upon which all men are bound to leave the streets, which are abandoned to the women for promenading and recreation. It is deemed a great offense against modesty to look at a woman then in the public streets, and any male finding himself by accident belated in the thoroughfares has to hurry to his home as fast as possible, holding his fan before his face, as the severest punishment would follow if he were discovered taking an inquisitive glance.

The Japanese government have been more successful than Mr. Oppert. They despatched a special commission to the Corean court, the result of which has been that a Japanese surveying officer spent three weeks in surveying the southern part of the country, and the commission have arranged for the opening of two ports in Corea for commerce with Japan.

INDIA.

The great survey of India has been continued. During the sixteen years of this survey, two hundred and ninety thousand square miles have been surveyed and mapped, including the wildest and most unknown parts of India.

NORTHWEST INDIA.

Major Biddulph explored, in 1878, certain tracts in Chitral and Yassin in the northwest frontier of India. In the Wurshigam and Kho valleys of this region he found a number of stone circles of huge boulders, about three feet high, with the flat side outward, which must have been brought to the spot from a distance with great labor. They were of the same general character as like circles found in France, Great Britain and other parts of Europe, and were evidently religious structures of a kindred race with those of Europe. He found the Chitrals a handsome people, with gypsy features and thievish habits—an interesting fact, as the gypsies are supposed originally to have come from this part of India. He describes a magnificent mountain looking down the Tarkhun valley, twenty-five thousand feet high, which filled the landscape and is the subject of many traditions. Major Biddulph's exploration resulted in a large amount of information of the region explored by him.

ASSAM.

Capt. R. G. Woodthorpe, R.E., made extensive explorations and surveys to the north and northeast in Assam, in which survey 1,500 square miles of country were accurately defined, and 400 square miles reconnoitered. The natives of the region, the Miris, he found to be a hardy race, of middle height, very wiry, and they appeared to be of the Tartar type.

MALAY PENINSULA.

In 1878 three Europeans and twenty-five Malays explored the high land in Eastern Perat, in the western part of the Malay Peninsula, a region never before visited by Europeans, and almost equally unknown to the Malays, the details of which are very interesting, but too numerous for me to attempt to give any general account of the journey. The expedition explored the sources of the Kinla River, and were the first to ascend the peak of Gimong Ream, as neither Malays nor Sakis go near it.

COCHIN-CHINA, CAMBODIA AND ANNAM.

Mr. C. F. Tremlett, as the result of ethnological investigations, says that the Indo-Chinese peninsula, which embraces Cochin-China on the south, Cambodia on the west and Annam on the east, was at one time inhabited by a people of Malay descent, from Cape St. James, in Cochin-China, to the Chinese peninsula, and that the present Annamese are of this race, modified by Chinese inter-mixture. He declares that the Cambodians differ entirely from the Chinese, the Annamese, and even from the Siamese, with the last of whom they are somewhat intermixed from the contiguity of the two countries. The British Consul at Saigon states that the native races in Annam, especially in the northern districts, where the races have remained more distinct, have the great toe of each foot separated from the others, like the thumb of the hand, and that it is used by them in the same manner as the thumb, though only to a limited extent. He says that this peculiarity is of great antiquity, being mentioned in Chinese annals, assumed by the Chinese to be as old as 3300 B. C.

JAPAN.

The geological survey of Japan, under the supervision of Mr. B. S. Lyman, has been carried on during the past year, which has been chiefly devoted to the examination of the oil lands, and to a general geological reconnoissance of the whole country, so as to ascertain in what parts detail surveys are most important.

Mr. A. R. Atkinson, together with Professor Dixon and a Japanese, Mr. Nakozawa, crossed Japan from Tokio, examining the mountainous regions in the provinces of Shinshin, Aida, and Etchiu, ascending in Hida the sacred mountain Haku Haku-san, this sacred mountain being one of many peaks in an extensive range, of which journey Mr. Atkinson made a sketch map, accompanied with tables, giving the approximate heights of places. They reached the summit of Haku Haku-san which is eight thousand seven hundred feet above the level of the sea, and the view from the top is described as magnificent. The result of this journey is a considerable amount of new geographical information respecting the mountain ranges, their direction, heights, and of the country through which the explorers traveled. They ascended also the peak of Gohonsha, about nine thousand two hundred and fifty feet above the level of the sea, where they found a body of pilgrims, and witnessed an interesting religious ceremony on the summit. Mr. J. Milne has collected considerable information respecting the aboriginal races of Japan, embracing an account of shell heaps, stone implements, small conical pit dwellings of a people called Koshito, said by the Japanese to be a race of dwarfs, and of inscriptions, mounds, implements, pottery, the caves of cave dwellers, and other remains.

LOO CHOO ISLANDS.

An American, with whose name I am not acquainted, visited the Loo Choo Islands, of which little comparatively has been known since the visit there of the *Alceste* in 1816. He says that the natives, who dress like the Japanese, resemble the Malays in feature, although they are of a lighter hue. He found them mild, intelligent, and very kindly in disposition. The women, he says, many of whom are handsome, work very hard. They do most of the field labor and of the carrying, poising their loads on their heads Their hands are tattoed with ink, which is begun in their fifteenth year, the design becoming larger as they grow older, and by the time they are thirty, he says, their hands look as though they were dyed in ink. In their marriages it is the mother of the bridegroom who determines upon the bride. The bride, when selected by her, has to work diligently for the mother-in-law during the allotted period of probation, and if she fails to please her, is sure to be rejected.

AFRICA.

The explorations in Africa have been so numerous that I shall have to follow them somewhat in geographical order:

NORTH AFRICA.

Mr. C. Tissot, who has been engaged in researches in Tunis, has explored the course of the Medjerda, finding many remains and inscriptions of the Romans.

Mr. Gerald Rohlfs, whom we had the pleasure of hearing before our Society some years ago, was sent out by the German African Society to explore the Kufarah Oasis in North Africa. He reached Kufarah, when the expedition was surprised, plundered, and the Doctor and his companion, Mr. Stecker, were compelled to return to the coast, which which was reached with great difficulty. He has still, however, determined to reach the oasis with another expedition in a new direction.

Subterranean Lake.

A wonderful subterranean lake was discovered last year at Hemelan, Algeria. The cavern explored was very high. It was covered with stalagmites of the most brilliant colors; and from the bed of the lake arose large stalagmites to the roof, looking like gigantic columns expressly erected to sustain the enormous arches of the cavern. The lake was about two miles and a half in length, and about a mile broad; fish swarmed about the raft with which the exploration was made, and when taken up were found to be blind.

So far as it was explored, it was an immense natural basin, supplied by powerful streams of water flowing in through fissures.

Flooding the Sahara.

The subject of flooding the Sahara, to which I have so frequently referred, has been recently considerably discussed. It is not now doubted, from the result of Capt. Roudaire's survey, that this could be done; but many eminent men in France are of the opinion that the result would be injurious, instead of beneficial. Prof. C. Martens and Mr. E. Dassaur declare that it would destroy the date culture, without exercising any favorable influence upon the climate of Algeria, as the vapors arising from the projected internal sea would be driven south into the Sahara, as northerly winds prevail. Dr. Cussan declares it would not attract trade to the Soudan, but, on the contrary, would facilitate the obtaining of arms and ammunition by the independent and warlike tribes, who would be more dangerous than before; and that the salt water would affect the wells of the whole country, as he thinks the sweet waters of the Chotts communicate with subterranean waters that feed the springs.

Dr. Rohlfs considers that the Sahara could be irrigated by wells in the bed of the ancient water-courses and by artesian wells, as was formerly done, many of which have been filled up by the tribes to prevent invasion, thereby greatly enlarging the area of the desert and contracting the oases scattered throughout it. Wherever a well is dug, he says, the desert becomes fruitful, the palms grow, as the sand after being well watered becomes fertile, and that water is found in depths from twenty-five to one thousand feet.

NORTHWEST AFRICA.

Mr. D. Mackenzie, to whose scheme for flooding the great Sahara from the West Coast I have heretofore referred, has, after great difficulties, succeeded in making a settlement at Cape Juby, on the Northwest Coast, from whence, he thinks, a large and important trade can be opened up with the interior of North Central Africa.

Mr. G. Schutt, who was sent out by the German-African Society to complete the labors began by the lamented Dr. Mohr, reached Malange by the way of Loando; but, in proceeding further in the Mai country, his progress was stopped by a son of Muata-Yambo, and the impoverished traveler found his way back through the country of the Bangarah to Malange.

Discovery of the Source of the Niger.

Mr. Soleillet ascended the Niger, with the design of penetrating in that direction to Timbuctoo, and from there to Algeria. He failed, however, and was compelled to return to the French settlement of St. Louis on the west coast, with the determination to make another attempt to reach Timbuctoo by the way of Tishet.

Last year, Mr. Verminck, a wealthy merchant of Marseilles, and the owner of numerous trading stations on the West Coast, determined, in view of the importance of the Niger, to renew the attempts that have been heretofore made to ascertain the sources of this great river. He accordingly despatched two of his agents, Messrs. Zweifel and Moustier, for this purpose. In the course of their journey they ascertained the interesting fact that the negroes, finding they derived great material benefit from the commerce in palm oil, had cleared off great tracts of forest land for the cultivation of this valuable tree, and the explorers, in their march, counted more than fifty thousand young palms that had been planted, and found that a law had been enacted by the natives condemning to slavery any one who should cut down a young palm.

Without detailing the particulars of their journey, it will suffice to state they were enabled to determine the exact position of several tributaries of the Upper Niger, and finally succeeded in reaching the stream which may be considered as the true Upper Niger, called, in the native language, the Tembi, the source of which they ascertained to be near the frontier of Koranko, in the vicinity of a village called Konlako. Their journey was one of great difficulty and suffering, owing chiefly to constant torrents of rain.

Liberia.

The government of Liberia has peaceably annexed a large territory west of the narrow strip along the coast heretofore constituting Liberia—an annexation highly beneficial to the native people of the territory now brought within the confines of Liberia, and which will greatly advance its resources and influence as a state.

The River Ogowa.

Lieutenant Savarin de Braza, whose efforts in the exploration of the river Ogowa I have previously described, in connection with Mr. Marche and Dr. Bellay, has returned to Europe, after three years of exploration, attended with great difficulties and trials, which has resulted in a very complete account of the river, which he has proved to be entirely distinct from the Congo, and to have no connection with any interior lakes. He divides the Ogowa into three almost equal parts, the middle portion of which follows the equator as nearly as possible, and the other two incline about 1½° southward. His last exploration, in 1878, was attended by the discovery of an important river, the Alima, about five hundred feet wide and sixteen feet deep, which appeared to be an affluent of the Congo.

In attempting to descend this river, the explorers had, like Stanley, to run the gauntlet, encountering hostile savages, who lined the river banks. They passed great villages, filled with enemies, who finally attacked them in canoes crowded with men armed with guns, so that Lieut. de Brazza was compelled to abandon the further exploration of the river, and after great sufferings, hunger and fatigue, finally reached the French settlement at the Gaboon. During the last months of their journey, he and his companion, Dr. Bellay, had to march bare-footed, their legs covered with sores, and half-starved, during which eight hundred miles of ground was covered, more than half of it on foot, in a region hitherto unexplored, as large as Belgium. Lieut. de Brazza's labors will greatly help to solve perplexing problems of African hydrography in this part of Africa.

In a recent paper on the races of the Gaboon and the Ogowa, Lieut. de Brazza questions Mr. du Chaillu's statement about the Fan cannibals and what he saw in their villages. He thinks that Mr. du Chaillu must have been misinformed by accounts he had received from races at war with the Fans. Lieut. de Brazza describes them as a kindly, generous and courageous people, and complains of the prejudice excited against them by Mr. du Chaillu. He admits that they are cannibals and eat their prisoners, but that it is from an idea that if they eat the heart of a great man, his courage would pass into them. It is very evident from this statement that Lieut. de Brazza has never read Mr. du Chaillu's book, or, if he has, has forgotten it, for Du Chaillu gives exactly the same account of the Fans that he does, merely mentioning in addition that he had heard that some of them dug bodies out of their graves and eat them while at the Gaboon, and mentions persons there who had heard the same statement. This is not the first time that the accuracy of Mr. du Chaillu's statements have been called in question. It was denied that he had ever seen any such animal as a gorilla, and that his statement that he found in this part of Africa pygmies like those mentioned by Herodotus, was declared to be a fabrication. In every instance, however, Mr. du Chaillu's statements have been verified. A live gorilla has since been brought from Africa and exhibited in Europe. Other travelers have verified the existence of the pygmies and M. de Braza himself found the Akkas, the dwarf race first seen and described by Du Chaillu, giving substantially the same account of them.

WEST AFRICA.

O. Schuett undertook to trace the course of the Kassai or Kassabi to its supposed confluence with the Congo. He was prevented from doing so, however, by the natives, but made a large survey of an hitherto unknown country between the Cuango and the Kassai.

The lower course of the river Cunene has been explored by three Portuguese naval officers, Messrs. Lima, Kueriol and Silva. The river reaches the sea about 17° S. lat., but is unapproachable at its mouth, owing to sandbanks. The exploration was accomplished, but it was one of great difficulties and hardships, owing to drought and the obstructions in the path of the explorers.

An agent of the English Church Missionary Society ascended the river Binue from its confluence with the Niger, in a small steamer, to a point eight hundred miles from the sea, making a careful survey of the river and penetrating the country for one hundred and fifty miles beyond Hamaruwa; and F. Spier spent two years in the exploration of the river Gambia, and penetrated farther up that stream than any civilized man has hitherto reached.

STANLEY'S RECENT LABORS ON THE CONGO.

Mr. H. M. Stanley, as the head of the expedition to the river Congo of the African International Association, founded by the King of the Belgians, is now engaged in the attempt to establish a line of stations along the Upper Congo, as far as Nyangwa, on the upper part of the Congo, to unite there with stations to be established by the association from the east coast. A steamer was dispatched by the association, drawing fourteen feet of water, to ascend the river, with a cargo consisting of materials for houses, huts, tents, provisions, arms and general merchandise for the establishment of the first station, at a point near the Yéllah Falls. She took with her, in sections, a small steamer, capable, when put together, of carrying thirty persons, intended to run upon the Upper Congo, above the Falls, and also three undecked steam launches, and three large flat-bottomed boats drawing sixteen inches.

The last intelligence from Mr. Stanley is that he has founded the first Belgian station at M'Vivi, on the Congo, about one hundred and thirty miles from the coast and five miles below Yéllah Falls, where an iron and a wooden house has been erected. From there he went into the interior with a well equipped expedition of sixty-five natives and fourteen Europeans. One of the steam launches was lost over the falls, and the remainder, with the materials for houses, had to be carried over a mountainous country, where the explorers will have to contend with enormous difficulties for three hundred miles before they can again make use of the river. A second station was to be established at Stanley Pool, above the falls, and two others in the far interior. Mr. Stanley is to make a thorough exploration of the Western Congo and of the countries upon its banks, and declares that it will take three years to carry out his present plans.

REV. T. J. COMBER'S EXPLORATION IN CONGO.

The Rev. T. J. Comber penetrated from the British missionary station at the foot of the Cameroon mountains, through an unknown region in the country of Congo, to Makuta. He describes Makuta as a town of two hundred houses, handsomely laid out in streets and squares, which are regularly swept, and embellished with trees trimly kept by a native people fond of ornament, and that he has never seen so pretty a town in Africa, nor in any part of it such real taste and neatness. Major Burton has declared that nothing could be more beautiful, picturesque and charming than the Congo river below the Falls. Mr. Comber has since been sent out by the Baptist Missionary Society of London, to establish a mission on the river Congo above the Falls, with the aid of a small steamer which was to be sent out in sections.

CENTRAL AFRICA.

Commander Cameron has recently given an account of the people of Urana, one of the largest of the native states of Central Africa, where the respect for sovereignty and rank is so strictly enforced, that no one is allowed to sit in the presence of the king or of a superior without permission, which is very seldom granted. Many of their customs are curious. They will not eat in the presence of each other, nor drink whilst any one is looking on, but if obliged to do so will hold up a piece of cloth as a screen. Ventriloquism is practised amongst them for religious deception; idols by this instrumentality being made apparently to speak. They allow their beards to grow very long and plait their hair like the Chinese, attaching a clod of earth to the pigtail to make it hang down. They have a very effective mode of communicating messages by the beat of a drum. It serves as a kind of telegraph, by which messages are sent and answers received over immense distances, and is much used in war in bringing up and concentrating forces.

MAJOR PINTO'S EXPLORATION ACROSS AFRICA.

The most remarkable of the recent explorations in Africa is that of the Portuguese explorer Major A. A. de Serpa Pinto, in his journey from Benguela, on the western coast, across the African continent to the Zambezi river, and thence in a southeasterly direction through the Matabeli kingdom and the Transvaal Republic to Natal on the Indian Ocean. This journey is remarkable, not only from the circumstance that a considerable part of it was through an unknown region to the south of the route pursued by Cameron, but from the fact that although it was attended with constant perils, trials and difficulties, this accomplished scientific traveller was able, by constant observations, to fix the position astronomically of every material point in his route. In respect to the astronomical and topographical observations, it is one of the largest contributions to the science of geography that has ever been made by a single traveler in a land journey of such length through savage tribes, which will be indicated when I mention that his diary fills five volumes of closely written matter set down with great exactness, and full of valuable geographical, topographical, barometical, meteorological and astronomical information.

Major Pinto had the advantage, not only of having lived for a considerable time in the Portuguese colonies of Western Africa, but also of being a very thorough scientific geographer, and it was for this reason that he was especially selected by the Portuguese government in connection with a general system of exploration instituted by that government, to explore the regions lying between their colonies and Victoria Falls, on the Zambezi; an expedition which he was left to undertake with little or no pecuniary aid. "I performed my journey," he says, "with scarcely any resources. I and my party had to live solely from day to day upon the product of the chase, and thus, with occasional help from friendly natives, I accomplished my very difficult task;"—to which should be added, that the natives accompanying him were almost entirely men belonging to a cannibal tribe. He started from Benguela, on the West Coast, November 12th, 1877, and arrived at the end of his journey in Durban, on the Indian ocean, on April 14, 1879, a journey occupying nearly twenty months. The first point reached was Bihè, where he was confined for three months by an attack of fever, though Bihê is comparatively healthy; and even when he departed from this place he was yet in a state of extreme weakness and exhaustion. He is a small, spare man, thirty-four years of age when he undertook this journey, and it seems incredible, says one who saw him after his return, that a man with so small a frame and so apparently weak, could endure such hardships and accomplish such a journey. He preserved his astronomical instruments by a very simple device. In trusting his chronometers to one of his native servants he said, "You see this makes a noise; you must never let this stop; bring them to me every day so that I may see that they are going; for the day that you forget to bring them to me you will be roasted alive;" and the superstitious attendant, in constant fear of the supposed spirits within, and to keep them quiet, punctually wound up the chronometers every day from that day forward. Once they were attacked by a numerous band of savages, who kept their baggage, including the chronometers, and while Major Pinto was lamenting their loss the following day, they were brought to him by the same attendant, who swam across a river and, watching his opportunity, obtained them from the place where the savages had deposited them.

In the limited character of my address, I cannot follow him through the whole of his extensive journey, but can refer only to some of the incidents and some of the information he obtained. He discovered the source of the river Cubango, West of Bihé; and, shortly afterwards, two of its affluents, finding the river to be contrary to all the descriptions of it on the maps. He says, in speaking of those affluents, "I use the words small rivers, but the smallest in Africa are almost always enormous ones." He found the river Cuqueima, to his surprise, running to the north, which was contrary to its position on the maps, and flowing from the north to the southwest, towards the Quango, of which it is an affluent. He afterwards struck the Quango, flowing to the north, and the Cuito, an affluent of the Cuando, running to the south. All the great rivers, he says, of South Africa have their sources in an immense rich plain, which is in 12° S. lat. The way in which rivers in this part of Africa take their rise and are formed, as described by him, is interesting. They begin with a slight humidity, resembling the trickling of a small fountain. By degrees, the current swells, and suddenly, without having received any visible affluents, it becomes an enormous river, on which any one may sail with a boat. He says he saw the source of the Cuando, first as a tiny rill, which flowed between his feet; that a little lower down, he descended it in a canoe, and that from thence, it was quite navigable, till it enters the Zambezi, where Livingstone calls it the Chobe, a name which Major Pinto says is utterly unknown at the present day in Africa. Not only is the Cuando navigable, but also many of its affluents; and there is a cataract at its extremity, which nearly proved fatal to the explorer, as it had not been previously mentioned by any one. There is, he says, no connection by water between the Cuando and the Cubango. While in the region of the Cuando, he met one of the most curious discoveries in his journey. He found that one of the carriers supplied to him by a friendly chief, was, to his astonishment, a white man, belonging to a race in Africa heretofore entirely unknown. This race, called the Cassequer, he says, exist in large numbers in this part of South Africa, and that they are whiter even than the Caucasians, with this distinction, that instead of hair, their heads are covered with small tufts of very short wool, that they have prominent cheek-bones, and eyes like the Chinese. He states that he has seen girls with such a complexion that, if their features were European, they would pass in Europe for beauties. Lieut. de Braza is of the opinion that this race of people came from North Africa, as he states that he has seen a race greatly resembling them, called the Ubamlo, south of the Congo. The men of this white African race, Major Pinto says, are remarkably muscular and robust, and that when they discharge an arrow at an elephant they bury the entire shaft in the animal's body. They live by themselves, subsisting on roots or the spoils of the chase; and it is only when their supplies fall short that they hold any communications with their neighboring race, the Ambuelos, from whom they obtain food for ivory. He describes them as a nomadic people, never sleeping two nights in the same encampment; that they wander about, in groups of from four to six families, over all the territory that lies between the Cuchi and the Cubango, and that they are the only people in Africa that do not cook their food, eating it raw. He makes the interesting statement, that it is the crossing of this people with the negroes that has produced, in his opinion, the race of mulatoes so well known in the lower part of South Africa, by the name of Bushmen; a race who differ from those from which they have sprung, as they cook their food, and are of a good disposition, though quite opposed to civilization. Mr. A. Alexander, to whose interesting researches in South Central Africa I shall presently refer, states, on the contrary, that the Bushmen are the aboriginal people of Matabeli Land, an extensive country lying north of the Transvaal Republic. He says, that unlike their allied races on Cape Colony, they are a fine, well-made people, but that in the land of their origin, which is controlled by another race, the Matabeli, they are treated by their conquerors like game, being hunted and killed for the mere pleasure of a day's shooting. When exploring the Kalahari desert, his assistants were principally Bushmen, whom Mr. Alexander declared to be the best behaved of all the black races that he has met with in Africa, and the most ill-treated.

In the course of Major Pinto's expedition, he found the river so abounding in crocodiles, that he and his negroes had to construct a bridge across it, which they effected in three days. He found tombs everywhere, through a territory otherwise quite desolate. What they had to endure in this part of their route may be inferred from the fact, that they travelled without food for nearly five days; and even when they obtained some canary seed, had thereafter a long interval of fasting of from forty to forty-eight hours, and in some points, came near perishing for want of food. At last he reached a friendly young chief, of the age of sixteen, who, with the generosity of youth, presented him with thirty oxen. He now found that those who had come with him from the west coast, wished to return, upon which he called his people together and said:

"You may go if you wish, you are free. I have nothing to give you, I do not wish you to submit to my fate, for I cannot foresee what may befall me;" upon which the blacks of Benguala, from the west coast departed, but the natives who had joined him at Bihé, being a race of travelers, adhered to him. He obtained a map drawn by a negro of Bihé, showing that the southern extreme source of the Lualaba—or, as we must now call it, the Congo—lies between the sources of the Zambezi and the Luangua, at 12° S. lat. The Luangua, sometimes called the Cafugue, he says is without cataracts, is navigable for 600 miles, and may hereafter become the best channel for penetrating through the centre of Africa. It is the river which Livingstone called the Carue, and Major Pinto declares that the exploration of the Luangua is at the present time the most important problem to be solved in Africa. He states that the river that connects Lakes Benguela and Moero is not the Lualaba, but the Luapula, as the Portuguese travelers, the Pombeiros, long ago declared. The Lualaba, he says, is the source of the Congo, and not the Chambeze, which simply prolongs Lake Benguela to the west.

The perils and sufferings encountered were so great that he was at last abandoned by all but two or three faithful blacks, whom he brought back with him to Lisbon, and who sat by him on the platform while he was giving the Geographical Society of that city, in the presence of a crowded audience, an account of this remarkable journey.

I cannot follow him in the description of the perils he and his companions encountered in descending seventy-two cataracts on the upper Zambezi. He says he saw thirty cataracts in the space of an hour and a half, that have never been mentioned by any one. He declares that in this perilous descent he was near perishing, not only from the cataracts, but from hunger; that fear never left him for an instant, and that between the intervals of delirium, he did his best to land and make a map of the cataracts and the banks of the river.

The whole of the country of the river he found well peopled, except immediately above the cataracts. Here, in this out-of-the-way region, he encountered an English naturalist, Dr. Bradshaw, reduced to the greatest misery, having nothing on him but a tattered shirt and a pair of trousers in a most ruinous state, who made his acquaintance with the greatest sang-froid, gravely presenting him with his carte-de-visite, printed in London.

Further misfortunes attended the intrepid explorer. He was attacked by fever, and owed the preservation of his life to the attention of the wife and niece of a French missionary, Coillard, " but no sooner had I recovered," he says, " after twelve days of unconsciousness, than the idea of continuing my discoveries became more intense than ever." He did not follow the lower course of the Zambezi, as it has already been sufficiently explored, but proceeded to Shoshong, near the river Limpopo, a territory which has been christianized and civilized to an extraordinary degree by the missionaries, McKenzie and Price. His journey from there to Pretoria, the capital of the Transvaal, was full of incidents; and from Pretoria he was able to transmit to Lisbon, intelligence of the accomplishment of his journey. Out of four hundred followers eight only arrived at Durban on the Indian Ocean.

Some of the results of this journey may be stated. He declares that fevers prevail all along the river banks of the Zambezi, and in the lands adjoining the river, but that the country extending inland from the highlands of Benguela, is the most suitable territory in all tropical Africa for colonization, being five thousand feet above the sea, fertile, well watered, and healthy. The people, he says, are docile, capable of improvement, are very fond of dress, and that a market would here be found for the consumption of foreign manufactures.

DR. HOLUB'S EXPLORATIONS.

Dr. Holub, to whose labors I have heretofore referred, has returned to Europe, after spending seven years in exploring the interior of Africa north and south of the Zambesi. His first two expeditions were among the Bechuana tribes, and his third and greatest was in the country of the Zambesi, which lasted twenty-one months. He surveyed the river with great care, making a chart on which every island, rapid and inflowing creek is accurately laid down. He gives a very interesting account of a people found by him in the southern part of Central Africa—the Marutse—who differ materially from those in the southern parts of Africa. They have great reverence for the Supreme Being, believe in a future state, and are distinguishable from others by the esteem in which women are held, their rulers being more frequently queens than kings. The slave trade was not allowed among them. They were traders in ivory and other articles, and had some knowledge of the arts; showing them to be a people much in advance of those usually found in savage Africa. Dr. Holub took great pains to obtain as full a knowledge as possible of the region between the diamond fields of the Orange Free State and the Zambesi, measuring the distance by counting every step he took in a march of two thousand miles. All this was achieved without any pecuniary assistance and without shedding a drop of human blood, although he travelled among the most savage tribes unprotected and at times too weak to have fired a gun in self-defence, which was the manner in which Livingstone and Du Chaillu travelled; and I may mention, as admonitory to future travellers in savage regions, that when the principal king of the Zambesi regions heard that Dr. Holub wished to visit his dominions he said: "If he will travel after the fashion of Monari (which is the African name given to Livingstone), then let him come, but not otherwise." I may mention an interesting fact in respect to this distinguished African explorer and of Livingstone's influence upon his future career. When Dr. Holub was a boy of thirteen years of age he taught the children of a widow lady for a stipend of a dollar and a half a month, to enable him to buy a copy of Livingstone's travels that he had seen in a shop window. At the age of twenty-five, after graduating as a physician at Prague, he went to South Africa with only one hundred and fifty dollars in his pocket where he has been exploring for seven years. Our own countryman and fellow-counsellor, Mr. Du Chaillu, was only nineteen years of age when he penetrated to the savage cannibal tribes east of the Gaboon, in the same successful way as Livingstone and Dr. Holub, discovering the gorilla and pigmy akkos, and bringing back to this city those remarkable specimens of working in metal and other handicrafts of the cannibal tribes, among whom he sojourned with entire impunity. Mr. du Chaillu then declared that the true way of exploring Africa was for the traveller to go unprotected and alone, which Livingstone and Dr. Holub have done. The last few years of our distinguished associate's life has been devoted to a thorough exploration of Scandanavia, especially Sweden, Norway, Finland and Lapland. We wait with great interest for his forthcoming work, which, from a portion of it that I have read in manusscript, will, I think, be far more fascinating than even his African travels, attractive as they have proved to readers in all countries of every age and sex.

MR. A. A. ANDERSON'S EXLORATIONS OF GREAT, HEALTHY AND FRUITFUL REGIONS IN CENTRAL AFRICA.

The country traversed in part by Dr. Holub has been, since 1864, the field of exploration of a resident explorer, Mr. A. A. Anderson, who, in 1878, communicated the result of his researches to the official government of Pretoria, which are of great interest and value. He has surveyed the region north of the Orange river, in what is known as Great Namaqua Land and the northern portion of the Kalahari Desert up to 16° S. lat. The Matabeli country he estimates as one hundred thousand square miles in extent, under one king, large portions of which are thickly populated, but to what extent he was unable to estimate. The Makumba country, bounded on the north by the river Zambeze, and on the east by the Portuguese settlements, he puts down at about forty thousand square miles, ruled by the Makumba and other chiefs, having under them a large and industrious population. A region stretching from the Makumba country on the north to the river Limpopo on the south, and from the Matabeli country on the west to the Portuguese settlement on the east he estimates at seventy thousand square miles, portions of which are thickly populated by a people who raise and manufacture cotton.

The country about Lake Ngami, ruled by a single chief, is stated to be forty thousand square miles, with a population of twenty thousand. Ovampo Land, on the west side of the Kalahara Desert, is given as sixty thousand square miles of country, with a population of thirty thousand, a splendid grazing country, which is well watered, has mountains rich in minerals, and is inhabited by an industrious people.

The Damara country, recently annexed by the Cape Government, extends from the sea to the Kalahara Desert; the coast line being but a sandy waste, but the eastern portion, he says, is rich in minerals. Great Namaqua Land, below this, and running south of the Orange river, which also extends from the sea to the Kalahari Desert, has a coast line which is also a sandy waste; but on the eastern border, near the Great Fish river, there are good grazing grounds, and mountains rich in minerals. He estimates it at seventy thousand square miles in extent, with a population of about twenty thousand, living under petty chiefs, who are lawless and dangerous.

He gives an interesting account of the country, lying east of the Kalahara Desert down to the British colonies, the details of which are too extensive for an address like this. In general terms he says that from the British colonies on the south up to 16° S. lat. there are nine hundred and fifty thousand square miles south of the Zambezi, and fifty thousand miles north of that river, exclusive of the Portuguese possessions either on the east or west coast. From 1869 to 1872 he was engaged in the survey of the Kalahara Desert, which had never been explored, and which, he says, could be made one of the finest countries in South Africa, and that it is a splendid field for emigrants. He considers the Mashona country now closed by the chief who rules there as affording a great field for enterprise in the cotton growing region of it, which covers a large area, and from which a water carriage to the east coast could be made at little expense. Gold, silver, and other minerals abound, rice is extensively cultivated, spices of all kinds flourish, and the tropical fruits, such as oranges, lemons, &c., arrive at great perfection. He says the fever districts of this part of Africa are confined to the Portuguese settlements on the east coast, the land along the valley of the Zambezi, the tract of country east of Lake Ngami and from that lake to the Cuando and the low country up to Victoria Falls. That large portions of Matabeli Land, and the Mashona district are free from fever; that on all the uplands and mountain ranges fever is unknown, and that from the west of Lake Ngami, through the countries already described, it is exceedingly healthy, like the Transvaal territory. I have enumerated these details, the information being derived from so reliable a source, to show what an extensive region exists in this part of Africa adapted from the fruitfulness of the soil, the healthiness of the climate and its mineral wealth for the future abode of civilized man.

EAST AFRICA.

The expeditions in East Africa during the past two years have been very numerous. Their object has been less the discovery of new lands than the thorough exploration of the countries already discovered, with a view of establishing stations and missionary settlements to facilitate communication with the numerous tribes dwelling in the healthy countries of the interior, the suppression of the internal slave traffic, and the bringing of valuable regions in this part of Africa under the influence of civilization.

Lake Ukerewe (Victoria Nyanza).

The expedition of the Church Missionary Society reached the head of Lake Ukerewe (*Victoria Nyanza*) from Zanzibar, and another portion of it, which proceeded up the Nile, was equally successful in reaching King Metza's dominion. Great apprehension was felt for the fate of this latter expedition from intelligence that King Metza was opposed to it, which has been dispelled by more recent information, and there is every indication that the mission will be successfully established.

Lake Mwutan Nzige (Albert Nyanza).

Mason Bey made a survey of Lake Mwutan Nzigi (*Albert Nyanza*), which has considerably reduced its area from the survey previously made by Gessi, but he did not succeed in solving ths question whether Beatrice Gulf, visited and named by Stanley, formed a part of the lake or not, so that the region south of the lake is still involved in much uncertainty.

Shoa.

The Marquis Antinori's expedition, to which I have so frequently referred, has proceeded beyond the boundaries of Shoa, the country lying immediately south of Abyssinia;

but the Marquis has returned to Italy, bringing back a large amount of scientific information. Signor Chiarini started, in 1778, for the Kaffa country, and when last heard from he and Signor Ceechi afterwards advanced to the country of Djumina, where they were captured by a native chief and had been subjected to forced labor of the most painful kind when they were last heard from.

Somali Land.

M. Reovil has made a journey into Somali Land, the country, as I have before stated, supposed by Dr. E. B. Tyler and other archæologists, to be the country from whence the ancient Egyptians originally came.

Mr. Reovil's account of his journey is exceedingly interesting. He was kindly received by the people, and he states the curious fact that they are governed by a system of laws having much analogy with that which prevailed in Europe during the middle ages. He found one of the customs of the middle ages still subsisting—the ordeal by fire. The people, like the Egyptians, have a profound respect for the dead, and especially for those who have fallen in battle. They are a people who have always succeeded in preserving their independence, having a thorough military organization, the children being sent at an early age to school, where they are taught not only to pray, but the use of arms, that they may be able thereafter to defend their liberties.

Galla Land.

The German scientific expedition, under C. Denhardt, started from Melinda, on the northeast coast, to explore the course of the river Tana, or Dana, which has been supposed to take its rise in the snowy region of Mount Kenia. They explored the river, and reached the spot where Mount Kenia has been indicated upon the map from various reports, but found only level plains; and, although they questioned more than two hundred persons, found no one who had even heard of that mountain.

The Rev. Thomas Wakefield, to whose labors I have frequently referred, made a journey from Malinda, on the northeast coast, to the country of the Bararetta Gallas, between the rivers Tana and Sabaki, examining especially the Galla districts of Sigirso and Kashé, lying in a northwesterly direction, in which region he found a group of lakes. The country, he states, after a three months' residence, is very fertile and exceedingly healthy. Dr. Fischer also made a journey to the borders of the Galla country.

Herr Marno's Exploration.

Herr Marno, the well-known African traveller, made a journey from Zanzibar into the interior, north of the route pursued by Stanley and Cameron, into what he calls Koa Kiora, where he found a cultivated country, corn and tobacco being raised by the people.

Dr. Junker's Explorations.

Dr. Junker, a Russian-African explorer, has returned to St. Petersburg, after a three-years' journey in northeast Africa. The doctor, during this period, has explored the whole of the watershed between the Upper Welle and the Nile, passing as far as Kalïka to the west of the mountains on the west shore of the Mwutan Nzige (*Albert Nyanza*). He has also gone through the northwest region explored by Schweinfurth, the region of the Mitte Dunka, Bango and Djur, as far as the other side of the Wau river. His exploration was mainly a geographical one, great attention having been given to topographical details. He brought back with him a great amount of material, from which he has constructed a collection of maps of the region traversed, which he is preparing for publication in St. Petersburg. After the publication of his maps, Dr. Junker intends to go upon another expedition in Africa, taking the most accessible route to Mombutto, which will be the basis of his further explorations. Dr. Junker is exceedingly well qualified for the exploration of this unknown part of Africa, from the knowledge he already possesses of the country, the people, and of their language. He is a man of abundant means, with a well-seasoned constitution, and, what is very important, a favorite with the powerful governor of the Egyptian Soudan.

Outlet of Lake Tanganyika.

It will be remembered that Stanley questioned Cameron's discovery of an outlet to Lake Tanganyika in the river Sukuga, on the west of that lake, founded alike upon Cameron's statement and what Stanley himself saw when he partially explored the Sukuga. This doubt has been set at rest by the fact that in a recent survey of the lake by Mr. Hore, of the London Missionary Society's expedition, the Sukuga was found by him flowing out of Lake Tanganyika, a large and swift river. He reached a point in the river further west than Stanley had gone, and from a high elevation the river was seen by him flowing westward as far as the eye could reach, and in the direction of the Lualaba or Congo, with which the outlet may possibly be connected. When Cameron and Stanley saw the Sukuga it was in the dry season, but when Mr. Hore ascertained what is above stated it was in the wet season, and what was seen by him puts it beyond doubt that the Sukuga river is the outlet of this great lake.

Commander Cameron, at a recent meeting of the Royal Geographical Society, said that the name of Lake Tanganyika was derived from a word meaning to shuffle or mix, and meant the mixing place of waters, a name especially appropriate, for he says that ninety-eight rivers flow into the southern part of the lake, besides springs and torrents.

Belgian Expeditions.

The African International Association inaugurated by his Majesty the King of the Belgians, to which I have previously referred, have despatched four expeditions from the east coast to Lake Tanganyika, one of which had reached there. Mr. Cambier, the leader of the first expedition, had arrived at Karena, on the eastern shore of the lake, and when last heard from was engaged in making arrangements for the establishment of the first station. He has published a sketch map of the route followed by the expedition, and interesting information respecting the natives of an ethnological character was obtained by one of the members—Dr. Dutrieux.

The second expedition, left Bagamoya, on the 2d of June last, where a permanent station is to be established in connection with a station in a bay on Lake Tanganyika to the south of Ujiji, and a further or third station beyond, at Nyangwe on the Congo, or, as it was before called, the Lualaba, the important point from which both Cameron and Stanley started on their final journeys across the African continent. This second Belgian expedition consisted of five Europeans, twenty-five natives and four Indian elephants. The interesting feature in it was the employment of elephants brought from India, which was an experiment, and the success that has attended it shows that a means has been found to facilitate exploration into the interior of Africa, which will greatly overcome the impediments arising from the delays, the desertions, the exactions and other difficulties heretofore experienced from the necessity of employing natives for the carriage of everything upon land in African expeditions. It was found that one elephant would march twenty-seven hours, carrying a load of over one thousand pounds; that these useful and sagacious animals could continue thirty-one hours without eating and forty without drinking, and endure great fatigue; that they were not affected at all by the climate, and were impervious to the attacks of the tetse fly, which has proved so fatal to horses, cattle, and nearly every other kind of animal in Africa. It is impossible to say from the experience gained whether the native African elephant can be effectually trained for this important kind of work, as doubt upon that subject is expressed in a letter written by a member of the expedition, but the African elephant has, in other parts of Africa, when taken young, been trained and rendered exceedingly docile. When I mention the fact that it was found that one elephant would carry as much as fifteen porters, and that, like the camel, it does a great deal in obtaining its own food, it will be at once seen how greatly the use of this animal, independent of many other considerations, will diminish the expense of future expeditions in Africa for exploration and geographical discovery. The last intelligence received is that a fourth Belgian expedition had been despatched from Zanzibar. The plan inaugurated by His Majesty the King of the Belgians, though attended with embarrassment in the beginning, from the death of those sent out to command the expeditions, is a most comprehensive one, as the expeditions from the east coast will be connected with Stanley's expedition up the Congo, establishing a line of stations across the continent, and it promises to be of the greatest benefit for the future of Africa.

Expedition of the London Missionary Society.

The London Missionary Society despatched an expedition under Dr. Southon, which reached Lake Tanganyika, and established a station in Uguha, on the west side of the lake, which is in charge of Messrs. Hutley and Griffith, while Dr. Southon himself is to settle at Urambo, the capital of King Mirambo, in Unyamwezi. The station of the society at Ujiji was placed in charge of Mr. Hoar, the scientific member of the expedition, whose especial duty it was to survey the lake and report upon places suitable for stations, and it was in the course of this survey that he ascertained what I have before stated in respect to the outlet of the lake. The journey of this expedition from the east coast to Tanganyika was made in one hundred days, the shortest journey previously being that of Stanley, which was two hundred and thirty-six days. The rapidity of the present expedition is attributed to the discrimination with which porters were selected by Dr. Southon, to the careful organzation that was maintained, and to propitious weather.

In their journey they passed through the country of Mirambo, with whose name we have become so familiar from the travels of Livingstone and Stanley. They describe it as a beautiful country, inhabited by a simple, pastoral race, who are in no way aggressive, but superstitious, curious and credulous in the extreme. Many of them had intellectual and even classical faces, and the women were frequently pretty and intelligent. Mirambo's capital they describe as a large square enclosure, with a substantial wall, containing full five thousand people. In the open space surrounding the enclosure there are numerous round, well-built huts, containing about ten thousand people, and many villages close to the capital.

Expeditions of the Roman Catholic Mission.

The Archbishop of Algiers, by direction of the Holy See, dispatched an expedition, consisting of sixteen Europeans, for the formation of two great missions in Equatorial Africa; one upon Lake Tanganyika and the other in some position in the vicinity of the lakes Ukerewe and Mwutan Nzige (*Victoria* and *Albert Nyanza*). The expedition reached Ujiji, on Lake Tanganyika, passing through Mpwapwa, of the climate of which they do not give a favorable account. They suffered severely from fevers and the want of proper food. Although dispatched for religious purposes, the expedition embraced geographical labor, such as determining astronomically the position of places, and they measured the distance from Bagamoyo, on the east coast, to Mpwapwa. From Ujiji, they explored Urunda, a rich region, of which they give a very different account from Stanley. The expedition ultimately reached Uvira, on the northwest extremity of the lake, where it settled. A detachment, as I infer, of this expedition, reached Uganda, on the northwest border of Lake Ukerewe (*Victoria Nyanza*). A second expedition of this organization, which left Algeria last June, with eighteen Europeans, had reached Unanyembi.

The Abbe Debaize's Expedition.

The Abbe Debaize, under the auspices of the French government, conducted an expedition for the exploration of the country south of Lake Mwutan-Nzigi (*Albert Nyanza*) and north of Lake Tanganyika, as well as the mountain regions west of these lakes, and, if possible, as far as the Congo. He reached Ujiji, on Lake Tanganyika, by a different and more northerly route than that taken by any of his predecessors, and had great success in conducting his expedition so far through an unknown country, which he ascribed to moral ascendency, strict discipline, and the measures adopted to keep the expedition in robust health. In a communication made by him, he stated that the power of the Arabs had greatly declined, that the ivory trade no longer supplied their wants, and as they are not allowed to traffic in slaves, that they will ultimately be compelled to abandon this part of Africa to the English, and that this change will be brought about without a shock and almost imperceptibly. He proceeded afterwards from Ujiji to the north of Lake Tanganyika, with unfortunate results. He was twice deserted by his porters, was plundered of a great part of his outfit, returned sick and discouraged to Ujiji, where he died last December.

LAKE NYASSA.

You will remember the important circumstance to which I have heretofore so frequently referred, of the establishment of a permanent missionary station at the southern extremity of Lake Nyassa, called Livingstonia, the introduction of a steamer upon the lake in connection with it, and the confident belief I had that these efforts would tend to the suppression of the internal slave traffic, with all its attendant horrors, which was so rapidly desolating this part of Africa, by the destruction of a people who gave every evidence that they were peculiarly adapted to avail themselves of the advantages of civilization. The successful establishment of Livingstonia has so far justified that conviction, and no work in Africa has so far been attended with more beneficial results, or is more full of promise for the future. Mr. D. S. Stewart, of the Livingstonia station, circumnavigated the lake, being the second survey of it, the object of which was to fix its exact geographical position and examine more particularly the northern part. It was ascertained by this survey that the northeast end of the lake would have to be shifted about thirty miles to the westward. Two harbors were found in the northern part, a very important discovery, as, without harbors, the navigation of this portion of the lake is subject to perils from which it might be difficult to escape. Mr. Stewart and Dr. Laws made an exploration west of the lake with very satisfactory results, in obtaining a knowledge of the country, and in establishing good relations with the people. A further expedition was undertaken for the exploration of the country lying between the north of the lake and the southern end of Lake Tanganyika.

KEITH JOHNSON'S EXPEDITION.

The Royal Geographical Society despatched an expedition to Zanzibar in 1878, under Keith Johnson, son of the well-known cartographer, and who himself became known from his geographical work in South America. The object of this expedition was the exploration of a direct route from the harbor of Dar-es-Salaam, which is on the East African coast, a few miles south of Zanzibar, to the northern end of Lake Nyassa.

Mr. Joseph Thomson, a geologist, was associated with Mr. Keith Johnson, the object being, not only to construct as complete a map as possible along this new route, a service for which Mr. Johnson was especially fitted, but to gather general geographical, ethnological, geological and other scientific information respecting the region, its products and its inhabitants, and especially to examine the range of mountains seen by the late Captain Elton, at the northeastern end of Lake Nyassa, and then to examine the unknown country lying between Lake Nyassa and the southern end of Lake Tanganyika. The expedition left Zanzibar last May, accompanied by Chulma, Dr. Livingstone's faithful companion, and one hundred and thirty-eight followers. It went up the valley of Lufiji, where their journey was attended by constant rains, and they were hardly ever out of marshes, the result of which was that Mr. Johnson was attacked by dysentery, which has proved fatal to so many African explorers, and after very severe suffering in their toilsome march, he finally succumbed and died at Beho-beho, a village in Kuta, near the Rhua river. Here a pathway was cut through the dense vegetation to a large tree, covered with creepers, which was selected to serve as a monument. A grave was dug at the foot of it, the corpse was enclosed in a kind of basket coffin, and the accomplished young explorer was laid in his final resting-place. His name and the date of his death were cut upon the tree, and a neighboring chief agreed to keep the place clear of vegetation. The command then devolved on Mr. J. Thomson, who, last September, arrived with the expedition at Mbungo, on the northern end of Lake Nyassa. On approaching the lake, the expedition was unable to discover the Uranga country and river, described by the late Captain Elton. Mr. Thomson believes that the river referred to by Captain Elton was the Mbangala, which flows into the Ruah.

SOUTHEAST AFRICA.

Captain Patterson's Expedition in Matabeli Land.

I have before referred to Matabeli Land. It is a country lying between the Zambesi and the Limpopo rivers, bounded on the east by the river Sabia, and on the west by the Zouga, or Botletle, a river flowing into Lake Ngami, and forms a somewhat irregular square, the length of each side being about four hundred miles, the population of which is estimated at two hundred thousand. Sir Bartle Frere despatched Captain Patterson to obtain accurate information regarding this important country, who, upon his way back, died by drinking, with several of his companions, the waters of a poisoned spring. From his diary, which was brought to Pretoria, it appears that Matabeli Land is ruled by a race of cruel Yula invaders, whose constant occupation is making war in the most savage and ruthless manner, burning towns, driving away cattle, and sparing only children, whom they carry off as slaves, their whole life from childhood upwards being one of bloodshed united with cruel religious rites. The unhappy people subject to them are ruled with a rod of iron, these invaders becoming every year more and more cruel. Their government is solely personal, consisting simply in the will of the chief. Death is inflicted for the slightest offense; any one changing his habits of life, or amassing property, is murdered by the chief's body guard, these murders being of constant occurrence and the only check upon these cruel rulers being the fear of the English government, which was the reason why Captain Patterson was able to pass through the country with safety. It is from his account a country rich in natural resources, well watered, with a good soil, has a fine climate, trees of great variety and size, and an abundance of iron ore. The missionary Coillard, to whom I have previously referred in connection with Major Pinto's expedition, has been in the country, and, on the contrary, declares that it is very unhealthy.

POPULATION OF AFRICA.

A recent estimate of the population of Africa has been made in England which puts it at 186 millions, being about an average of 16 inhabitants per square mile. The negro regions are the most populous. In the desert regions the population is sparse, but it is very dense in other regions; thus, in the Soudan, it is estimated at 80 millions, or 53 persons to the square mile. The population of East Africa has been estimated at 30 millions, and that of equatorial Africa at 40 millions. The races are divided, in a recent German general estimate of the whole, as follows: Negroes, 130 millions; Hamites, 20 millions; Bantus, 13 millions; Fulas, 8 millions; Nubians, 1½ millions; Hottentots, 50,000, which would make up 172,550,000, somewhat less than the recent English estimate. This is a great increase upon the estimate of a few years ago, of about 60 millions, but our information was then inadequate to form any estimate at all, and the one now made is only conjectural and approximate, and may be too small in respect to some of the races; for the Bantus are here put down at 13 millions, whereas F. M. Muller considers that they constitute at least one-fourth of the population of Africa, and may be 50 millions. The suppression of the entire slave trade, and the influence of European civilization, will undoubtedly lead to an increase in the population, which increase may be rapid and very great. We cannot, however, hope for many years to have sufficient information to justify an estimate upon which any great reliance can be placed. All attempts at present must be largely founded upon conjectures formed from the loose statements of travellers and several regions, the population of which is certainly great, will probably long escape anything like a thorough examination. The country, however, is undoubtedly very populous. There are, for example, in the regions of the Great Lakes, countries quite as thickly peopled as many of the States of Europe. Stanley tells us of countries of relatively small extent, and which yet possess millions of inhabitants. When we shall have succeeded in getting sufficient reliable information, we may possibly reach a figure as high as the present estimate. In any point of view, however, the enormous populations of this great continent shows what a field it may become in the future under the influence of civilization.

BORNEO.

Herr Carl Boch has made a journey in the centre of Borneo, ascending the Klintjouw river as far as Longwai, thirty miles farther than any civilized man had previously penetrated. He found the Dyaks of the interior more wild and savage than those of the coast, but on the whole partial to the visits of strangers. He discovered, however, a far more interesting race still further removed from civilization, the Orang Poonan, or forest people, who construct no houses, but live in the open forest. They were not dark, but of a fair and yellowish complexion. He describes them as a good and honest people, except that, like all the savages of Borneo, they were given to the practice of cutting off heads; the term head-hunters being applied to many of the savage tribes of Borneo, who have the same natural propensity for cutting off heads as the North American Indian has for taking a scalp. A rajah with whom he came in contact showed him a collection of the heads of the Dyaks of another tribe, taken, not in open fight, but by treachery while they were asleep.

Settlements have been made by an English asociation, who obtained a large concession in the northern part of Borneo embracing a part of the northeast coast, comprising an area of seventy-eight thousand square miles, and a coast line of five hundred miles, extending from the Kimanis river on the northwest coast to the Sibuco on the east, and having four excellent harbors, one of which is San Dakan bay, a fine sheet of water fifteen miles long and five broad. A great part of the interior is unexplored. The country, as far as known, is everywhere rich and fertile. This association has given to their concession the name of "New Ceylon."

JAVA.

Mr. Charnay, well known as the explorer of Yucatan and Mexico and who is to take charge of the expedition proposed to be dispatched by the French government and Mr. Pierre Lorrillard, of this city, for archæological researches in Central America, explored the east and west portions of the island of Java, and recognized what he regards as a very close resemblance between the great epoch of Buddhist civilization in the Sunda Islands of the Malay Archipelago and that of ancient Mexico. He gives an interesting account of the density of the population of Java; for, although the inhabitants live in the shelter of forests, the population, he says, exceeds in density per square mile the most populous country in Europe.

SUMATRA.

The results of the Dutch expedition to Sumatra, to which I have previously referred, are, that much has been ascertained respecting the heretofore unknown centre of the island. Contrary to the prevailing geographical impression, the Bottang Hari was found to be the largest river. It was ascertained to be two hundred and ten miles in length, in a straight line, and four hundred and ninety miles following its various windings, and is navigable for small vessels drawing three-and-a-half feet of water for three hundred and seventy miles, and for small prahus for four hundred and eighty miles. The population upon it was found to be scanty. Cattle abound in the highlands, and coffee was largely cultivated in Karinchi.

NEW GUINEA.

Mr. A. Goldey cruised along the southeast coast of New Guinea, and found the currents and calms prevailing there a great source of danger. On his way along the coast he discovered a group of islands not heretofore put down on the charts, and two splendid harbors, the finest he had seen in New Guinea, one of which is in Freshwater Bay. He discovered some tribes hitherto unknown, and also a new river on the west side of Cloudy Bay. His exploration appears to have been chiefly along the shores of the Gulf of Papua.

A New Zealand vessel spent some time in Astrolabe Bay, on the northeast coast, and found the natives simple and friendly.

Mr. Rafra explored the northern part of the island, visiting the Arak tribes in Doree and the Peninsula. He states that the natives of the northeast are negroes, but that they differ physically from those of Africa, the nose not being flat, but aquiline. They are cannibals, and, he says, very coveteous. He passed nearly a year in the country.

Signor Albertis, whose explorations in New Guinea I have so frequently mentioned, has given a general account of the portions of the island visited by him. He states that the mountains and plains of the northeast part of it are clothed with luxuriant forests, to clear which would be a task of great labor; that the land is fertile, but whether the white races can live there is, in his judgment, problematical. The white races, he says, cannot be acclimated on the lowlands, and that the region of the Fly River does not possess any of those large animals that makes Africa so attractive.

All hope of finding rich goldfields in New Guinea appears to have been abandoned. The last of the expeditions that went there in pursuit of mines have returned, worn by privations, fatigue and constant discouragement. These explorations, however, have not been without results, as they have made known a part of the country having great agricultural capabilities, which is peopled by an interesting race, who are thrifty, industrious and kindly, entirely different from what was anticipated.

AUSTRALIA.

There have been several explorations in Australia. Mr. W. H. Cornish examined the country northeast of South Australia for a trigonometrical survey; the chief difficulty encountered being the want of water, notwithstanding which, and the scarcity of food, the natives appeared to thrive.

Mr. Feve made a survey for a railroad from Blockhall, in Queensland, to Port Darwin, in the northern territory of South Australia, encountering few difficulties, save the want of water. Mr. H. Vere Barclay explored in South Australia, between 21° 50′ and 23° 40′ S. lat., and 133° 53′ and

138° E. long., with, however, no very important results, and Mr. W. H. Tietkens has been engaged in surveying the country lying between the south coast and the Musgrave range, some three hundred miles north of the coast, following the route, for the most part, traversed by Mr. Jess Young and himself in 1874.

The chief exploration was under the leadership of Mr. A. Forrest, who has been on several expeditions in Australia during the last ten years. This expedition was from Perth to Port Darwin, along the northwest coast of Australia, its main purpose being to examine the country between the De Gray and the Victoria rivers, between 20° 20′ and 15° S. lat., and 19° and 129° 20′ E. long. It occupied six months. The expedition travelled about four hundred miles to Beagle Bay, discovering a large tract of country suitable for sheep and cattle; from thence they went to King's Sound, and followed it to Fitzroy River, which is described as a noble stream, teaming with fish and navigable with small steamers for one hundred miles inward, the whole country abounding in emus and kangaroos. The river basin Mr. Forrest estimated as containing five millions of acres adapted for pasture lands. From thence they went northwest to Collier Bay, and attempted, after great trials and difficulties, to reach the Glenelg River, but, after toiling one hundred and forty miles, had to abandon the attempt to get further north. I have not space to follow their route, except to state that, in making their way to the Victoria River, they discovered millions of acres interspersed with large rivers running northwest; that they met large numbers of natives who had never seen a white man, and were unmolested by them, but they never met a woman. In the subsequent stages of their journey their trials were very great, the blazing heat of the tropical sun drying up their store of water in a waterless country, where they suffered terribly from thirst. They pushed on, however, and were resolute amid terrible sufferings, the tongue of each man being so swelled that it nearly choked him and rendered all of them speechless, and they would probably have perished had they not met a party, by whom they were rescued, and brought to what is known as the Catherine Telegraph Station. The result of this journey, attended with so much suffering, is the important discovery of about twenty millions of acres of valuable pastoral land.

CONCLUSION.

This enumeration of what has been done during the last two years, though given in a very general way (for it is impossible in such an address to go much into details), is sufficient to show that we are living in a great geographical age. The fact that I have here referred to *twenty-one* distinct explorations, during this short period, into unknown or imperfectly known parts on the continent of America, North and South—*thirty-two* in Africa and *thirty-eight* in Asia—which have either been organized expeditions or journeys of individual travellers for the purpose of exploration and discovery, shows a determination by the civilized nations of the earth that every part of it accessible to man shall be thoroughly explored. It may, in conclusion, be confidently said that the work now going on will not stop unless arrested by a general war or some great convulsion of society; and that the close of the nineteenth century, remarkable as it has been in other respects, will, in this feature alone, take rank hereafter as one of the great epochs of mankind.

APPENDIX.

LETTER OF LIEUT. FREDERICK SCHWATKA, U. S. ARMY, COMMANDING FRANKLIN SEARCH PARTY.

CAMP DALY, NORTH HUDSON BAY,
March 31*st*, 1879.

CHIEF JUSTICE DALY,
President American Geographical Society.

DEAR SIR : I take advantage of the return of the American whaler *Isabella*, Captain Garvin, of New Bedford, now wintering at Marble Island, to give you a brief description of the present status of the Franklin Search Party.

Last fall, upon entering Hudson bay, I found the greater portion of the Esquimaux located near Depot island, and this fact, dependent as I was upon them for dogs, guides, and further confirmation of the story upon which the expedition was based, forced me to locate my party of white men also here, as there was no time to attend to all this business in a few days—one or two—all which Captain Barry could spare from whaling, and then transfer to Repulse bay, which point I should have very much preferred as being so much nearer my objective point, be it the Gulf of Boothia or King Williams' Land.

During the fall of 1878, I surveyed the coast of North Hudson bay as well as the protracted bad weather would permit, and I enclose you a rough chart, showing the result of my limited labor. The value of this will become apparent if you will take the trouble to compare it with the latest Admiralty charts of this section of the country. Marble island, in whose harbor American whalers annually winter, is nearly 2 degrees of longitude too far to the westward, and the adjacent shore proportionally incorrect. I do not understand this, as in Bowditch the longitude is nearly correct. The continuous bad weather last fall, the worst which Captain Fisher has seen in fourteen years' continuous whaling in this bay, prevented me from having more to show in the way of explorations. In September I was cast away on an island, where I was compelled to remain three days without food, the whaler *A. J. Ross* being wrecked fifty miles eastward in Rowe's Welcome. In regard to the Nachillas, I found out that there had been three families of them that had been living among the Iwillees, or Hudson bay natives. These families had come since the departure of Captain Hall in 1868, which accounts for his silence in regard to this band. The head of one of these families, an aged paralytic called by the whalers "Monkey," had died the season previous to my arrival. One other, called "Ik-kee-sik," is a young man who left the Nachilla country when quite young and knows of the Franklin story only by hearsay. He belonged to my party, and as I have placed him in possession of a gun, ammunition, etc., which he never had before, he seems much attached to the Kodlunahs or white men, and will, I think, prove faithful. The other Nachilla is about 40 years of age, probably older. In the latter part of January I had a long and satisfactory conversation with him regarding the knowledge possessed by the Nachillas of Franklin's party. "Nu-tok-ee-ak," such is his name, gave me much information, mostly corroborative of that obtained by McClintock, Rae and Hall, but some of it was new and important. His father had found a stone cavern on the south side of King William's Land, which he had opened, and found concealed therein a small tin box containing a piece of paper on which there was writing. He did not know on which part of the south of the island the cairn had been found or what had since become of the paper. When a young man, he had visited South King William's Land, and there was shown a despoiled cairn, which had been erected by the retreating white men on a very large flat stone, this bearing the appearance of having been dragged to this spot, as it rested on a sandy tract some distance from a rocky ledge. This cairn the Nachillas had previously torn down, nothing being found therein, and had endeavored, at many different times, unavailingly, however (as their parties were always small), to dislodge the large stone. Nu-tok-ee-ak with a companion tried to overturn it once, but was also unsuccessful. He believes, as do all the Nachillas with whom he has talked, that nothing being found in the upper cairn, that something is buried under it. Asking him to point out the site on the map, he placed the pencil point on the coast on the north side of Washington bay, about ten or fifteen miles northwest of Cape Herschel. Ik-kee-sik, my Nachilla guide, knows the site of this stone, he having seen it when a small boy, and says that we will have no trouble in finding it again, as he claims he will be able to go directly to it. Nu-tok-ee-ak appears to me to be very accurate in his knowledge of geographical positions. When asked to locate the three boats he was describing to me, and which are no doubt the same alluded to by McClintock and Hall, he placed the pencil point within five or six miles of the spot as described by these officers. Without asking for such information, he told me that there was an immense cairn on Cape Herschel, erected many years ago by white men, and the Admiralty charts show such a cairn to be erected by Ross at that point in 1839. The Nachillas visit the southern shore of King William's Land only during the time that sledging is practicable, when there is plenty of snow upon the ground. During July and August, when the snow is gone, it is entirely deserted. They very seldom visit the western coast. He further speaks of a boat that some Nachillas found on the peninsula somewhere between the mouth of Back's river and Barrow inlet, on the southern coast of Simpson strait. He had never heard of any cairn or cache made by the white men being found opened by natives and articles abstrated, with the single exception of that one despoiled by his father. The many Franklin relics obtained by previous search parties and Arctic voyagers from the Esquimaux have all been found at the tent and boats described by Hall and McClintock, or near the many skeletons which are strewn along the southern coast of King William's Land. There are many more skeletons than Hall and McClintock saw, or even heard of. So many were not lost upon the ice as Hall supposed, but are buried beneath the deep snows in the Spring, the only time in which search parties have traversed these parts. Nu-tok-ee-ak cannot fix even approximately any number, but says expressively that there are many more than the Nachillas can count. He says that none of the white men ever passed through the Nachilla country, lying southeast of King William's Land, on the adjacent mainland, which they would be compelled to do to reach Repulse bay, or any portion of the Gulf of Boothia. Neither he, nor any of the other natives here, know or have ever heard of any cairn made in the latter place. The Nachillas, in fact, never visit this country. From all the information which I can obtain here, I find it utterly impossible to confirm, even in part, the story on which the present Franklin Search Party is based. In fact, I am thoroughly convinced there is nothing whatsoever in it. Officers of whalers here, who have had many more advantages, and were with Captain Barry at the time, know nothing of his information. My expedition, therefore, if anything can be accomplished, must look to King William's Land and the opposite mainland, especially along Back's river, as its theatre of operations, having the advantage over previous search parties of a summer's survey when the snow is gone—an advantage which a short sojourn in this Arctic country would soon convince any person cannot be overrated.

I start to-morrow on my sledge journey to King William's Land, having four white men and twelve Innuits, with three heavy sledges of fifteen dogs each, and one light one of six or seven dogs. The distance to Cape Felix, the furthest point which I desire to reach, is about four hundred and fifty miles, two hundred of which, to the nearest point on Back's river, has never been trod by previous explorers. Of this two hundred miles, I have made a preliminary survey of about one hundred (across land to the head of Wager river), leaving only about one hundred which can be sufficiently rough to hinder the progress of the party. From the general character of the country I fear no such misfortune, and Joe believes we have got a better route than that pursued by Hall. I shall return when the autumn snows make sledging practicable, and if I find an American whaler wintering here, will return in her, in the fall of 1880. Should there be none, I shall transfer my party and material to either Forts York or Churchill, the most northern posts of the Hudson Bay Company, some fourhundred miles to the south, and return to England in their ship.

With these brief statements I close, and hope and believe that something will be done by my party to justify the expectations of the contributors who fitted out the expedition. I know that some little knowledge will be added to Arctic geography, and from the many points in King William's Land which now offer so many inducements, I hope to find something.

I am, dear sir,
Very respectfully,
Your obedient servant,
FREDERICK SCHWATKA,
Commanding Search Party.